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NTI switches get Multirate ISDN support

By Bob Wallace
Senior Editor

NEW YORK — Northern Telecom, Inc. is expected to announce this week new software for its central office switches that will enable carriers to dynamically establish switched service links for users at speeds up to T-1.

The software will enable local telephone companies and long-distance service providers to support Multirate Integrated Services Digital Networks.

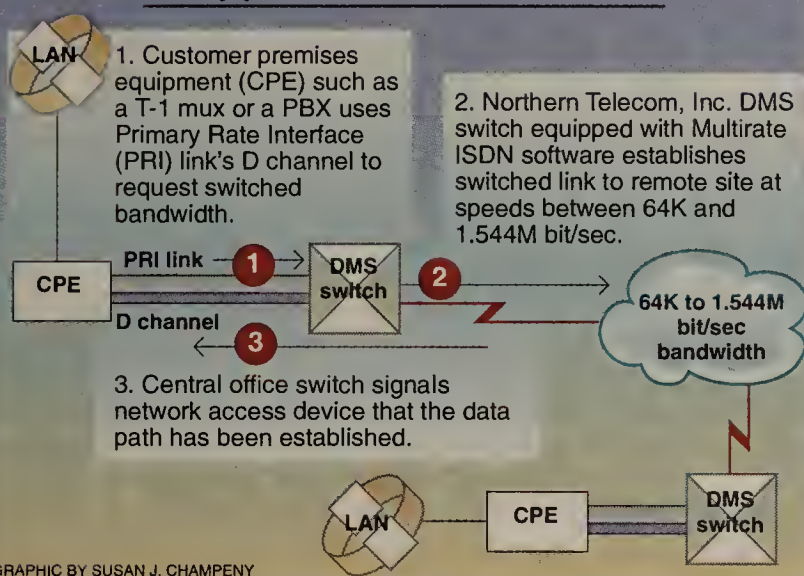
With Multirate ISDN, a user linked via an ISDN Primary Rate Interface (PRI) to a Northern Telecom central office switch will be able to establish — on demand — switched digital links at speeds ranging from 64K to 1.544M bit/sec.

New York Telephone Co. has agreed to use the new central office switch software beginning early next year for providing Multirate ISDN to users in its territory, according to a company spokesman.

The carrier, Northern Telecom and the City University of New York this week will demonstrate the software.

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Northern Telecom software supports Multirate ISDN



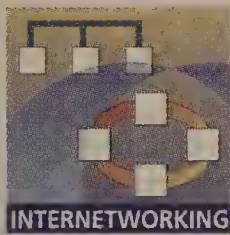
Service a sore point with bridge/router customers

By Maureen Molloy
Senior Writer

Bridge/router products have quickly become a key underpinning for enterprise networks, but many say vendors have not kept pace in providing the service and support needed for these increasingly sophisticated devices.

In the rush to add new protocols and interfaces, many bridge/

router vendors have overlooked more fundamental customer requirements, including local support and service facilities and help in planning and implementing nets, users said.



Suppliers acknowledge service shortcomings but are promising enhanced support via more on-site technical specialists, a greater number of re-

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AT&T moves toward ATM hub offering

NCR unit to unveil StarLAN hub with bridge and routing functions that will evolve to ATM switch.

By Jim Duffy
Senior Editor

LINCROFT, N.J. — AT&T subsidiary NCR Corp. plans to unveil new versions of its StarLAN hub that offer LAN bridging and routing functions and will eventually evolve into ATM switches for local-area networks.

The StarLAN Network SmartHubs will come in Ethernet and token-ring models, both of which will house cards that support bridging, routing, terminal server and net diagnostic functions. Ultimately, the SmartHubs will become Asynchronous Transfer Mode switches that link to wide-area ATM services and deliver integrated voice, data and video to users' desktops at gigabit speeds.

"Customers have asked for scalable wiring closet solutions," said Gary Thomas, manager of the product marketing group for NCR's Network Hardware business unit. "They'd like to be able to plug boards into a single device" that provides both LAN and wide-area network connectivity.

NCR's goal is to deliver within

three years "a local-area ATM solution based on SmartHub technology," Thomas said.

Users hope NCR, which assumed responsibility for AT&T's

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FEATURES



■ Internetworking hubs sport lower prices, more features. Page 47.

■ In a nutshell: all about APIs. Page 67.

Soft-Switch to downsize E-mail switch

By Bob Brown
Senior Editor

WAYNE, Pa. — Setting its sights beyond the IBM mainframe environment where it has thrived, Soft-Switch, Inc. this week will unveil a new Unix-based electronic mail gateway designed to interconnect multivendor E-mail nets.

Soft-Switch's new software, code-named Spyder, runs on Data General Corp.'s AViiON computers and is designed as a low-cost scalable messaging backbone — the platform used to provide message exchange and directory services for disparate mail systems in an enterprise.

Spyder will be based on the 1988 X.400 standard and will initially support an X.500-like directory.

(continued on page 10)

Sprint, Centel to unite in \$2.85 billion stock swap

Users see promise in combination of services.

By Bob Brown
Senior Editor

KANSAS CITY, Mo. — Sprint Corp. and Centel Corp. last week announced plans to merge into what could become the nation's only single-source provider of long-distance, local and cellular network services.

The combined company, which will use the Sprint name, could be a one-stop shop for a wide range of services, from frame relay and other long-haul data and voice offerings to local access and wireless communications. The pooling of financial and technical resources bolsters Sprint, which will have an oppor-

tunity to leverage Centel's cellular expertise for new products, such as personal communications network services.

The company will boast combined assets of \$14 billion and revenue of \$10 billion. If the deal is completed, Sprint, the nation's third-largest long-haul carrier, will provide 5.7 million local telephone lines in 19 states and serve more than 20 million potential cellular customers in 14 states.

Users responded enthusiastically to the proposed merger.

"This appears to strengthen Sprint's financial base, which has to strengthen its long-distance

(continued on page 8)

NETLINE



NOVELL OFFICIALS explain how NetWare LANs will support growing ranks of mobile computer users. Page 2.

GUPTA EXPANDS distribution by signing Novell to market its products. Page 2.

HOUSE BILL WOULD BAR carriers from charging government users for toll fraud losses. Page 4.

SYNOPTICS WIDENS its network management portfolio with a new low-end offering. Page 6.

UNDAUNTED BY the threat of major strikes against AT&T, users weren't taking any unusual precautions last week. Page 6.

MFS LAYS OUT PLANS for national expansion, new services. Page 6.

AT&T lays out global plan for InterSpan frame relay

Carrier will expand service by year end to seven European countries through its AT&T Istel unit.

By Bob Wallace
Senior Editor

BASKING RIDGE, N.J. — AT&T last week became the first of the top four U.S. carriers to detail its plans for offering frame relay service internationally.

AT&T will offer the service by year end to Belgium, France, Germany, the Netherlands, Spain, Sweden and the U.K. through AT&T Istel, a U.K.-based value-added network provider that AT&T acquired in 1988.

International deployment of InterSpan will enable AT&T's existing frame relay customers to extend their network reach to

sites beyond the U.S.

"We had to offer frame relay outside the U.S. to address the worldwide needs of our multinational customers," said JoAnn Patrick-Ezzell, marketing vice-president for AT&T's Data Communications Services group. "We'll continue to add countries based on customer demand."

MCI Communications Corp., Sprint Corp. and WilTel have voiced intentions to offer frame relay abroad but have not specifically stated where and when. But while AT&T is the first of the major long-haul carriers to outline

(continued on page 10)

Novell unveils strategy for supporting roaming users

Virtual volume technology will extend NetWare.

By Margie Wylie
Senior Editor

PROVO, Utah — As Apple Computer, Inc. announced its Newton palmtop line and the birth of a projected \$3.5 trillion industry, Novell, Inc. lost no time in discussing how it plans to accommodate this new type of device in its NetWare LANs.

Company officials last week revealed that Novell will use DataClub's "virtual volume" technology to extend the net to roaming users, even when they are disconnected. The officials offered no time line but said the company is working on incorpo-

rating the technology into NetWare clients and servers.

Acquired in the purchase of International Business Software, Ltd., DataClub is a virtual file system for the Apple Macintosh. Simply put, the software allows network managers to assign disk space — no matter where it physically exists — to a single logical server, more commonly called a shared volume in Macintosh and Unix circles.

To users, the aggregate disk space looks and is accessed the same as a server; administrators manage it as a single entity.

(continued on page 6)

Novell set to resell line of Gupta database products

By Caryn Gillooly
Senior Editor

MENLO PARK, Calif. — Novell, Inc. and Gupta Technologies, Inc. next week are expected to announce a joint marketing and distribution agreement under which Novell will resell virtually all of Gupta's product line.

According to the companies, Novell will resell Gupta's SQL-Base database server, its SQLWindows graphical database application development package, the Quest query tool and SQLGateway, which provides connectivity to IBM's DB2.

Novell will not repackage the

products but will put its label alongside Gupta's on the boxes. It will market the products through its own resellers.

Analysts said the agreement is a boost both for Gupta, which gets wider distribution of its offerings, and for Novell, whose resellers will have a richer array of products and be able to serve as one-stop shops for users' client/server needs.

"Novell recognizes it has to get out of focusing on just file and print services to fit the bill," said Stuart Woodring, director of software strategy research at Forres-

(continued on page 66)

Briefs

IBM, Parallan deal to go down. IBM is expected to reveal this week that its reseller deal with Parallan Systems, Inc. has gone through ("IBM, Parallan to announce superserver marketing deal," NW, April 27). Sources said IBM will also unveil the first product stemming from the agreement, the Personal System/2 Server 295, which will basically be a Parallan Server 290 II with an IBM logo. The offering will ship with a single Intel Corp. 80486 processor — upgradable to two processors — four independent memory controllers, a dedicated processor for more efficient access to system memory and multiple intelligent Small Computer System Interface I/O processors. The server will support DOS, OS/2 or Microsoft Corp. Windows clients and will run OS/2 under IBM's LAN Server, Microsoft's LAN Manager or Novell, Inc.'s NetWare network operating systems.

Now it's NetWare 4.0. The next generation of Novell, Inc.'s NetWare network operating system will be Version 4.0, not Version 3.2 as it has been commonly called, according to Jan Newman, executive vice-president of the NetWare Systems Group.

In addition to previously reported enhancements to NetWare's security, directory and wide-area networking features, NetWare 4.0 will include DOS client software with a modular redirector that can be outfitted with a NetWare Lite module, Novell's peer-to-peer LAN product ("NetWare 3.2 to reshape net landscape," NW, March 16). This will enable NetWare clients to access servers or, on a peer basis, other clients. Today, clients that need both types of links have to be loaded with separate NetWare server and peer shells. Newman also said 3.11 remains a key product and will continue to be enhanced.

Bell bill moves along. The House Subcommittee on Economic and Commercial Law last week approved a bill that imposes on the seven regional Bell holding companies substantial periods of delay before they can enter the information services, equipment manufacturing and long-distance service markets. H.R. 5096, The Antitrust Reform Act of 1992, introduced by Jack Brooks (D-Texas) in mid-April, now goes on to the Judiciary Committee, the last stop before going to the House floor for a vote. The National Telecommunications and Information Administration said President Bush intends to veto the bill.

Cable & Wireless adds diversity. Cable & Wireless Communications, Inc. last week announced a service that provides route diversity on access lines to its network. Dubbed Split Stream T-1, the service uses digital access and cross-connect system technology to split T-1 traffic into two diversely routed paths of 12 DS0 channels headed for a common destination. Cable & Wireless said the service is available in Atlanta, Baltimore, Chicago, Dallas, Houston, Kansas City, Mo., Los Angeles, New Orleans, New York, Philadelphia, Pittsburgh and Washington, D.C.

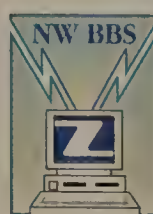
MFS takes on the RBHCs, GTE. Metropolitan Fiber Systems, Inc. (MFS), an alternative access service provider, last week charged the seven regional Bell holding companies and GTE Corp. with trying to forestall competition in the local access market via discriminatory pricing tactics for high-capacity services. MFS said certain users with large-volume, long-term contracts are paying the RBHCs and GTE as little as 25% of the basic monthly tariffed rates for some services. MFS called for the Federal Communications Commission to adopt rules to stop the so-called abuses.

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Bill would protect government agencies from toll fraud charges

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Rep. Barney Frank (D-Mass.) has launched the first legislative effort to prevent carriers from charging users for toll fraud losses.

While Frank's bill would apply only to government users — all federal, state and

local government agencies, as well as state universities — it marks the first time the federal government has attempted to intervene in this contentious issue that has pitted carriers against their customers.

If passed, the bill would make it illegal under the Communications Act of 1934 for a carrier to charge government customers

for toll fraud losses unless the carrier can prove the user was negligent.

In addition, the bill would prevent carriers from collecting charges as a result of toll fraud after a customer notifies the carrier of suspected fraud and even if the user is later shown to have acted negligently.

Users have been pressing lawmakers and the Federal Communications Commission to protect them from toll fraud, one example of which is when hackers steal authorization codes and access private branch exchanges or voice mail systems to make calls around the world.

Last year, losses from toll fraud topped \$1 billion, according to one industry association.

Thus far, the FCC has only opened a proceeding to get user views on the matter. But customers want the FCC to spread the liability for toll fraud between users, carriers and equipment manufacturers.

The bill goes only part of the way toward this end since it doesn't cover corporate users and probably won't be expanded to do so, Frank said.

Good intentions

Len Evenchik, director of communications for the commonwealth of Massachusetts, said he "applauds the thought" in Frank's bill but questions why it singles out government users.

"Rather than have special consideration for a small set of customers, I would rather see carriers be more proactive in general on toll fraud," Evenchik said.

Peter LaVenía, director of telecommunications management for the state of Delaware, said he supports Frank's legislation.

"We haven't had any instances of people hacking in our network, but it doesn't mean we're immune. Users have to fight constantly against toll fraud," LaVenía said, adding that Frank's legislation would give users one more weapon.

Frank's bill is designed to protect government users after fraud has been perpetrated. But users are also pressing for legislation or regulations that would help them prevent toll fraud by forcing carriers to monitor for suspicious usage and give users the ability to deactivate lines.

In recent weeks, AT&T and Sprint Corp. have announced services — for which customers must pay extra — that are designed to catch toll fraud early before losses mount. Those offerings also set a cap for user losses.

But more is needed. "Those offers don't go far enough," Frank said in an interview with *Network World*.

Toll fraud conditions

Frank's bill sets the FCC up as the overseer of toll fraud disputes. Within 180 days after the law is passed, the FCC must issue regulations that prevent carriers from collecting on toll fraud charges until after an investigation is carried out as well as rules for determining whether users have been negligent in protecting their networks from unauthorized use.

Government users who suspect fraud would have 60 days from the date of billing to question suspicious charges. Carriers would then have 30 days to acknowledge the dispute and 90 days to either drop the charges or detail how the user was negligent.

During that period, carriers would not be able to take any action to collect the charges in question.

If a carrier did not comply with the provisions above, it would lose all rights to collect disputed charges.

Last week, Sprint voiced opposition to the bill. "Our security team works closely with users to make sure they are not victims of toll fraud," a spokesman said, adding that legislation just isn't needed. An AT&T spokesman said the carrier is reviewing Frank's bill and has no comment yet. □

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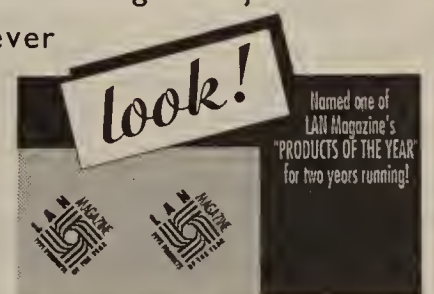
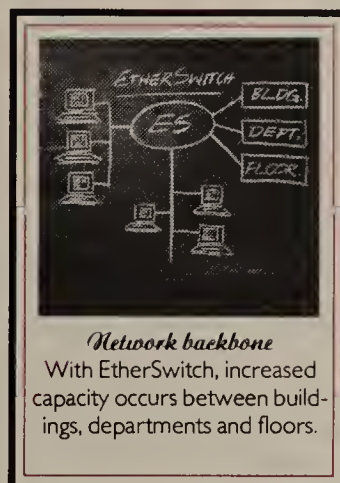
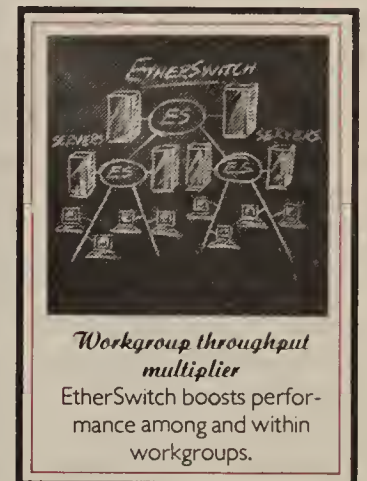
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SynOptics unveils low-end net management system

By Skip MacAskill
Staff Writer

SANTA CLARA, Calif. — SynOptics Communications, Inc. last week announced a new low-end network management system for its intelligent hubs that promises to simplify management of small to midsize Ethernet-based local-area internetworks.

The new Lattis EZ-View system fills in the bottom tier of SynOptics' net management product line, joining the high-end LattisNet Manager for DOS for users choosing to migrate. Upgrades are also available from EZ-View to either of the two larger systems.

Lattis EZ-View, which will replace SynOptics' LattisNet Basic Network Management for DOS, is geared to small work group or departmental local-area network environments using a maximum of 15 SynOptics System 2000 or 3000 hubs.

"LattisNet Basic Network Management for DOS was too complex and offered too much functionality for our low-end cus-

tomers, such as network mapping capabilities," said Doreen Pizarro, product marketing manager for SynOptics. "They wanted a simple, straightforward management system at a low price that would keep their networks up and running. EZ-View will do that."

SynOptics will continue to support LattisNet Basic users that stay with that system or will provide a software upgrade to LattisNet Manager for DOS for users choosing to migrate. Upgrades are also available from EZ-View to either of the two larger systems.

EZ-View, which works only over Transmission Control Protocol/Internet Protocol-based Ethernets, supports the Simple Network Management Protocol and can run on any workstation under Microsoft Corp. Windows 3.1. When used in Novell, Inc. environments, it requires that company's NetWare 3.11.

Other requirements include a

color monitor, 6M bytes of random-access memory, a 40M-byte hard disk drive and a Compaq Computer Corp. 80386 hardware platform or 386 compatible.

The software is based on the company's Expanded View technology, which provides graphical representation of concentrators in real time, as well as port-level monitoring and control capabilities.

All managed concentrators appear in a window on the management station screen, which offers a color-coded display to report hub status. An alarm feature automatically notifies an administrator of network problems, such as a faulty interface card. Through EZ-View's port- and slot-level partitioning feature, the administrator can shut down a failed card to prevent the net from being flooded with bad data.

EZ-View can operate in the background while other applications are used on an administrator's workstation. If a problem is detected, EZ-View automatically notifies the net manager via a warning window.

EZ-View is available now and costs \$695 per license. □

Novell unveils strategy

continued from page 2

But unlike a physical server, users who disconnect from this network can continue to work just as if they have access to its full range of services. They can browse files and send electronic mail, facsimiles and print jobs that will be executed when they physically reconnect, according to Steve Nelson, director of marketing for Novell's Walnut Creek, Calif.-based Macintosh unit.

A distributed database stored at each node or server keeps track of where a file physically exists on the network and is updated when the user reconnects to the net. By default, DataClub tries to store files created at the local hard drive, so any file created by an end user is likely to be available even when the user disconnects from the net.

Despite all the talk about wireless connections, this capability will be important to users who will initially be more likely to phone home than beam home, analysts said.

"Remote dial-in is going to be the biggest way that anyone gets in on these things," said Lee Doyle, director of worldwide local-area network research for International Data Corp., based in Framingham, Mass.

"Wireless technologies just aren't mature enough yet," agreed Hilary Mine, research analyst for Market Intelligence Research in Mountain View, Calif.

Novell continues to sell DataClub for AppleTalk Filing Protocol-based systems, which means Macintosh networks can use the software today.

In the future, the company will port the software to run on NetWare servers and other types of NetWare clients, starting with DOS and Microsoft Corp. Windows, company officials said.

NetWare will also be modified to store and retrieve complex object-type data generated by this

“Wireless technologies just aren't mature enough yet,”
Mine said.

▲▲▲

class of devices. NetWare's file system will be able to store, locate and retrieve complex data objects such as video, voice and text mixed with graphics.

John Edwards, executive vice-president of Novell's Desktop Services Division, said improvements such as NetWare Global Messaging and global naming services, due in NetWare Version 3.2 in late summer, will play a crucial part in mobile computing.

Novell's NetWare Lite and its DR-DOS slim memory version are also likely to be aimed squarely at palmtop users, Edwards said. □

AT&T users unfazed by threat of major job actions

Carrier faced May 30 strike deadline by unions.

By Skip MacAskill
Staff Writer

WASHINGTON, D.C. — Despite the fact that AT&T last week was facing the possibility of a major strike by its two largest workers' unions, users were confident service would continue as normal and weren't taking any unusual precautions.

"We're concerned but not desperately worried," said John Crankshaw, manager of telecommunications at Steelcase, Inc. in Grand Rapids, Mich. "During past strikes, we've been taken care of by management and nonunion people. A strike — if it happens — won't be business-threatening, but we will have to make some compromises."

Steelcase would consider turning to other vendors to meet its needs if a strike disrupts its AT&T service, he said.

No agreement yet

The Communications Workers of America (CWA) and the International Brotherhood of Electrical Workers (IBEW) have been negotiating with the carrier since April to forge a new three-year pact, but issues of employment security have hindered a settlement.

The two unions, which voted

to authorize a strike if a settlement was not forthcoming by the May 30 deadline, represent about 127,000 AT&T employees, including 17,000 operators and 31,000 production plant workers, as well as network systems technicians, report clerks and customer representatives.

“We're concerned but not desperately worried,” said Steelcase's Crankshaw.

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CWA and IBEW concerns revolve around the more than 125,000 jobs they claim to have lost since divestiture in 1984, the majority of which have been attributed to AT&T automation measures. The two organizations are pushing the carrier to cut back on its use of subcontractors and other nonunion workers.

AT&T's recent acquisitions of NCR Corp. and Paradyne Corp. are also factors. Employees have faced “unprecedented, virulent

antiunion campaigns” from the management of those two companies, according to Gaye Mack, a CWA spokeswoman.

Herb Linnen, director of media relations for AT&T, said the carrier was hoping to avert a strike. “We take a great deal of pride in our employees who belong to the unions. They are the best there is and we need them on the job.”

But he acknowledged that AT&T was ready if a strike occurred. Linnen said the carrier would utilize management and supervisory personnel, as well as retired managers, in the event of a strike. Workers from temporary employment agencies are also an option.

He stressed that meeting the needs of its customers was AT&T's first and foremost priority, but the unions were contending last week that a strike would make that difficult to do.

“When a company loses 127,000 of its employees, people are going to notice,” Mack said. “Customers would at the very least experience some delays because managers [are] not accustomed to doing these jobs.”

Some users, such as Steve Wood, telecommunications manager at Hambrecht & Quist, Inc. in San Francisco, disagreed.

“I'm not really concerned because my AT&T use centers on their 800 and credit card services, which are pretty much fully automated,” he said. “For the most part, human intervention is minimal.” □

MFS shares blueprint for expansion thru acquisition

Alternative carrier to go nat'l, details FDDI service.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — At last week's annual conference for alternative local carriers, Metropolitan Fiber Systems, Inc. (MFS) unveiled its strategic plans for both nationwide expansion and new data services.

MFS, which has fiber-optic nets in 13 cities, said its goal is to achieve a national presence through expansion, joint ventures and acquisitions. It also unveiled plans for new data services, including a high-speed Fiber Distributed Data Interface service the National Aeronautics and Space Administration began using two weeks ago to interconnect multiple local-area networks.

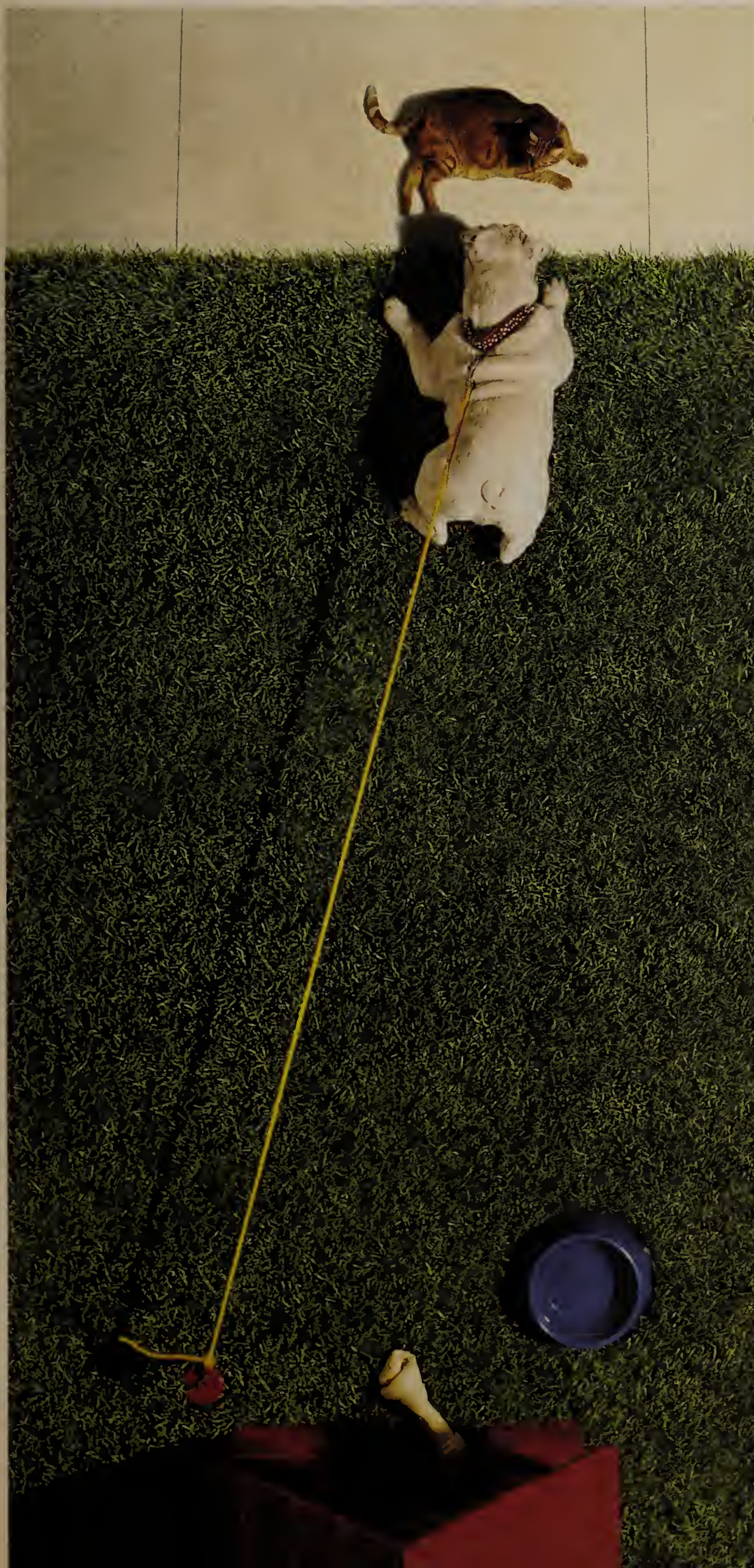
Ronald Beaumont, MFS senior vice-president of operations and engineering, told attendees at the Association for Local Telecom-

munications Services conference here that his firm is ready to purchase companies that will help MFS build a national presence in local transport services geared for business customers.

MFS plans to expand into cities where alternative local transport carriers are permitted by regulatory agencies to provide switched and private-line services in competition with established local exchange carriers, he said.

The push is already on. MFS begins service in Atlanta on June 30 and is wrapping up an acquisition of alternative local transport provider Digital Direct, Inc. of Seattle. “We're targeting 50 to 70 cities,” Beaumont said.

Momentum on certain key regulatory issues is gaining speed at the state and federal levels, which will result in improved network access for local transport
(continued on page 8)



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Sprint, Centel unite in stock swap

continued from page 1

business," said John Morrison, vice-president of voice information services at Sears Technology Services, Inc. in Schaumburg, Ill.

Sprint's increased local presence could be a boon for Sears Technology Services, which is trying to improve the efficiency of local phone usage. Morrison said Sprint may be able to better coordinate billing for both local and long-haul services, among other things.

Tom O'Toole, director of com-

trol of our network."

"This makes Sprint a stronger company overall," added John Bain, a telecommunications analyst at Raymond James & Associates, Inc., an investment firm in St. Petersburg, Fla. "Sprint will have more clout with customers, suppliers and investors."

Jack Frazee, chairman and chief executive officer at Centel, announced in January that the company's board of directors was examining the sale of all or parts

which Centel does business.

The merger involves a \$2.85 billion stock swap under which each Centel share will be converted into 1.37 shares of Sprint stock, which worked out to about \$33.57 a share on May 27, the day of the announcement. That price is about \$9 below what Centel shares had been trading for, which has led to some concern among shareholders — who have to approve the deal — and analysts who expressed concern that stockholders could upset the merger.

The merger could be finalized shortly after shareholder meetings are held by both companies late this summer.

William Esrey will remain Sprint's chairman and CEO, while Frazee will become the company's president and chief operating officer.

According to Esrey, the merger will improve efficiency of operations, which could result in up to \$100 million in savings annually. Overlapping local telephone operations will be consolidated and redundant positions will be eliminated, reducing the combined work force of 52,300 by at least 1,000 people, he said.

The combined local divisions will help the carrier better serve customers and develop new services on a collaborative basis, Esrey said.

The merger may also enable Sprint to expand into emerging markets, such as personal communication nets, he said. But specifics on new services won't be announced until later.

Esrey emphasized that the merger will not alter Sprint's commitment to the long-distance market. "This merger is in no way going to divert our attention [from] and commitment to that business," he said. ■

AT&T moves toward ATM hub

continued from page 1

StarLAN, StarWAN and StarGroup networking products last fall ("NCR fills out net environment," *NW*, Oct. 14, 1991), can come through.

"We want to get to ATM," said Fred Reimers, technical consultant for telecommunications at ICI Americas, Inc. in Wilmington, Del. "We're looking at what hardware would be on the premises to interface to the service."

Journey to ATM

As the first step on the road to an ATM hub, NCR plans to roll out in September the SmartHub XE, a hub based on a 10M bit/sec backplane that will sport as many as 84 10Base-T Ethernet ports or 42 fiber ports, and feature seven slots for optional bridging, routing, terminal server and diagnostic modules. Those modules will roll out late this year and into next, Thomas said.

NCR plans to follow up on the Model XE with the Model XL, an 84-port hub for token-ring LANs, in the second quarter of 1993. The Model XL, which will have a 16M bit/sec backplane, will also support as many as 42 fiber ports.

The bridging module for the Model XE is expected to support the Spanning Tree Protocol standard for Ethernet bridges. A bridging module for the Model XL will likely support source route bridging for token-ring LANs or, if the proposed standard is stable

“We want to get to ATM,” Reimers said. “We’re looking at what hardware would be on the premises to interface to the service.”

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enough, source route transparent bridging, Thomas said.

NCR plans to link the hubs to its StarLAN 100 Fiber Distributed Data Interface concentrators through the bridges, Thomas said.

The routing modules for both models will be similar in function to NCR's StarWAN Brouter Model 100, which is manufactured by Cisco Systems, Inc., Thomas said. NCR and Cisco are discussing joint development of the modules, he said.

The routing modules will support Open Systems Interconnection, Transmission Control Pro-

tol, Novell, Inc.'s Internetwork Packet Exchange (IPX), Digital Equipment Corp.'s DECnet, Xerox Corp.'s Xerox Network Systems and Apple Computer, Inc.'s AppleTalk network protocols. In addition, they will support a number of interrouter protocols, including the Routing Information Protocol, Open Shortest Path First, Internet Gateway Routing Protocol, Intermediate System to Intermediate System, Border Gateway Protocol and Exterior Gateway Protocol.

NCR plans to roll out the routing modules by the second quarter of 1993.

NCR's goal is to evolve SmartHub into an ATM "switching engine" for linking ATM LANs to ATM WAN services at gigabit speeds.

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The asynchronous terminal server module will allow users to connect as many as 96 asynchronous modems, terminals or printers to the SmartHub. The module will support TCP/Internet Protocol's Telnet virtual terminal protocol. NCR is evaluating support of DEC's Local Area Transport terminal protocol, as well.

The hubs will support as many as two interfaces — any combination of T-1, T-3, X.25, frame relay and Switched Multimegabit Data Services.



Additional support

The new hubs will offer more features than NCR's existing SmartHubs, which do not support bridging, routing or terminal server functions. SmartHub Models B and E support 12 10Base-T ports, one attachment unit interface port and one RS-232-C port for transmitting network management information.

Although the company is not releasing many details today, NCR's goal is to ultimately evolve SmartHub into an ATM "switching engine" for linking ATM LANs to ATM WAN services at gigabit speeds. This switching engine will provide bandwidth on demand to support bandwidth-intensive multimedia applications that integrate voice, data and video traffic.

AT&T recently disclosed that it has formed an internal task force across its business units to migrate its customers to ATM (see "AT&T looks to migrate users to ATM equipment," page 13). ■

What Centel, Sprint bring to the table

Company:		
Based:	Chicago	Kansas City, Mo.
1991 revenue:	\$1.18 billion	\$8.8 billion
Employees:	9,300	43,000
Primary businesses:	Provides local telecommunications service with 1.6 million access lines in 6 states; operates cellular networks (either full ownership or minority interest) in 76 metropolitan areas, serving about 16.4 million potential customers.	Third-largest U.S. long-haul carrier; operates local telephone networks in 17 states, serving more than 4 million access lines.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: CENTEL AND SPRINT

munication systems at Westinghouse Communications Systems in Pittsburgh, another Sprint user, applauded Sprint's reentry into the cellular telephone market. Sprint sold its cellular business to Centel in 1988, using the money to help fund its acquisition of part of GTE Corp.'s long-haul service unit.

"The wireless world is something people in my position have a keen interest in," O'Toole said. "We'll be looking at ways to tie in cellular services with our other Sprint services to gain better con-

of the company. Frazee said Centel wanted to maximize shareholder value and gain economies of scale to compete effectively in the rapidly consolidating telecommunications market.

Centel, which is based in Chicago, runs local telephone operations in six states and provides cellular services in 76 metropolitan areas via operations it owns or has a minority interest in.

Along with its long-haul and packet-switching nets, Sprint operates local telephone networks in 17 states, including four in

ture — probably later this year in New York. Another new division, MFS Datanet, Inc., was set up to serve the need for LAN-to-LAN in-

MF S Services will offer Centrex-like services probably later this year.

▲▲▲

terconnection over high-speed links such as 100M bit/sec FDDI. Late last year, MFS inaugurated its first FDDI LAN-to-LAN connection for Baylor University in Houston.

Now MFS is set to offer the same service to customers here

over the 215 miles of fiber it has installed in the Maryland, Virginia and Washington, D.C. area. The first customer, NASA, began using the FDDI service just a few weeks ago, Beaumont said.

Pricing for the 100M bit/sec service is set on an individual customer basis, he said, adding that the company is considering whether usage-based pricing would be feasible. MFS would also like to work with long-distance carriers to connect LANs on MFS networks in various cities.

Beaumont emphasized that MFS intends to stay out of the interexchange market so it can avoid stepping on the toes of MFS' largest customers, the long-distance carriers.

"As long as they remain our biggest customers, we will stay away from competing with them," he said. "They will remain a sacred cow." ■

MFS shares plan for expansion

continued from page 6

providers, he said.

Of particular importance, MFS anticipates that the Federal Communications Commission will issue an order this fall requiring local exchange carriers to collocate competitors' equipment in central offices. That action would cut in half the cost for MFS to interconnect its transport facilities to a local exchange carrier switching office.

As part of its expansion plans, MFS reorganized its corporate structure a few months ago, creating a holding company called MFS Communications Company, Inc. MFS, Inc. will continue to provide its traditional special access private lines.

MFS Services, Inc. will offer Centrex-like services in the fu-



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NTI switches get ISDN support

continued from page 1

strate Multirate ISDN service using inverse multiplexers provided by Ascend Communications, Inc. and Teleos Communications, Inc.

Other switch vendors, such as AT&T Network Systems, said they are developing software to support Multirate ISDN but declined to provide specific details. Siemens Stromberg-Carlson said it will offer software that supports the service sometime next year.

Using Multirate ISDN, a network access device — such as a T-1 multiplexer, inverse multiplexer or a private branch exchange — transmits an ISDN Q.931 message that contains the telephone number of the remote site and the number of 64K bit/sec channels needed to support applications such as local-area network interconnection. The message is transmitted over the PRI link's D channel to a carrier switch.

The switch then establishes a single, contiguous pool of bandwidth across the user's carrier net and signals the network access device that the link has been established. In order to use Multirate ISDN, network access devices must have software written to an emerging Multirate ISDN specification developed by Bell Communications Research and submitted to ANSI for approval.

The user's network device can also instruct the central office switch to add or delete switched digital links if needed, but therein lies a problem, said Rod Randall, a founder of Teleos, an Eatontown, N.J., access device vendor.

The user can add more capacity on the fly, but the existing link must first be torn down, he said.

By contrast, some inverse multiplexers can add bandwidth in the middle of a transmission. "I don't see the method that Multirate ISDN uses to establish different size channels as being as elegant as an inverse multiplexer," Randall said. "But I expect future versions of Multirate ISDN to address this issue."

Establishing switched capacity with Multirate ISDN, however,

Establishing switched capacity with Multirate ISDN can be faster than using an inverse mux.



can be faster than using an inverse mux. Users can set up a high-speed link with a single call, while a base model inverse multiplexer without PRI must dial up each 64K bit/sec channel separately to create a pool of bandwidth.

Further, inverse muxes use noncontiguous channels to transmit data over carriers' networks and the device at the distant end of the link reorders the traffic. That can delay data delivery and increase costs. For instance, six

switched 64K bit/sec channels typically cost more than a single 384K bit/sec switched link.

Ken Kovarik, Northern Telecom's Multirate ISDN product manager, said the company will provide the upgrade for its DMS-100, 200 and 250 switches. MCI Communications Corp. and Sprint Corp. have standardized on Northern Telecom switches, and the regional Bell holding companies use them widely throughout their territories.

MCI plans to offer a Multirate ISDN service "in the near future," but would not provide a date. "It's definitely something we're working toward," said an MCI spokesman.

And Sprint is throwing its weight behind Multirate ISDN.

Rick Simonson, Sprint's director of advanced services development, said the carrier has worked with Northern Telecom for almost two years to provide the software upgrade and hardware needed in order for its DMS-SuperNode switches to support Multirate ISDN.

The carrier plans to conduct a Multirate ISDN trial late this year or early next year, and if there is adequate user demand for the offering, Sprint will provide a Multirate ISDN network service.

"We anticipate a definite need for [multirate ISDN], Simonson said.

Sprint has not yet selected participants for the trial, and Simonson said his company would probably be interested in broadening the trial to include a local exchange carrier that offered Multirate ISDN. ■

Soft-Switch to downsize switch

continued from page 1

rectory based on Oracle Corp. database software. Later, it will support actual X.500 directory services, analysts said.

Soft-Switch is a major player in mainframe messaging environments with its IBM MVS- and VM-based Soft-Switch Central gateways, which support interconnection of multivendor E-mail systems. Soft-Switch also offers various personal computer-based E-mail gateways and E-mail management software.

DG and Soft-Switch officials said they would be involved in a new product announcement this week but declined to comment further. Users and analysts who have seen or have been briefed on Spyder gave it rave reviews.

Spyder will help Soft-Switch attract users looking to downsize applications, as well as companies without mainframes that are building enterprise messaging systems, said Dan Blum, a principal at Rapport Communication, a Washington, D.C. consultancy.

According to Barbara Reilly, program director for interenterprise systems at Gartner Group, Inc., a Stamford, Conn., market research firm, Soft-Switch is positioning Spyder as "an appliance" — a turnkey package of Soft-Switch software and DG hardware. "You can think of it as a mail router, a device you hang out there on the network to glue your disparate E-mail networks to each other," she said.

Spyder will be based on the 1988 version of X.400, which includes improved security and directory features over 1984 X.400, and Soft-Switch is expected to pitch Spyder as a robust X.400 switch, analysts said. Soft-Switch Central supports an X.400 gateway, but it must run on an adjunct computer.

Spyder also is expected to feature network management capabilities that will enable users to track messages over their E-mail nets and view trouble spots via a terminal.

Analysts said they have not heard of any Soft-Switch strategy to migrate Spyder to Unix platforms other than the Reduced Instruction Set Computing-based AViON computers but added that such a plan would not be much of a stretch.

Further product details were not available.

While exact pricing was not disclosed, Spyder is expected to be priced less than Soft-Switch Central, which starts at \$15,000 but can cost about \$90,000 when X.400 gateway and network management software is included, Blum said. Spyder pricing is expected to start at about \$30,000.

"Spyder gives users a reasonable price point [for a messaging backbone], which is very expensive to jump into when it's a mainframe-based Soft-Switch Central world," said Richard Mason, vice-president of systems and technology at Comtex Scientific Corp., a Stamford, Conn., electronic news service that runs Soft-Switch Central on an IBM 9371 mainframe.

"Spyder opens up electronic mail [backbones] to another level of companies. Its price could make X.400 and other mail-enabled applications more popular," Mason said, adding that he has only seen Spyder in beta form.

Steve Mahaney, a vice-president at Chase Manhattan Bank, N.A. in New York, a large Soft-Switch user, said his company is considering implementing Spyder down the road.

"We're looking at Spyder as a replacement for Soft-Switch Central even though the full functionality of Soft-Switch Central won't be available with the initial release of Spyder," Mahaney said. "We've been looking for a product that would allow us to move to a standards-based backbone. Spyder is definitely a step in the

"Spyder opens up electronic mail to another level of companies."



AT&T lays out InterSpan plan

continued from page 2

its global plans, those plans are not as wide in scope as those announced by some other service providers, including BT North America, Inc., Cable & Wireless Communications, Inc. and Info-net Services Corp.

BT North America, for example, plans to offer service through 15 switches in Europe and six in the Asia-Pacific region by mid-1993.

"This shows AT&T is not going to sit idly by and let competitors jump into the driver's seat with international frame relay," said Steve Taylor, president of Distributed Networking Associates, a Greensboro, N.C., consultancy. "AT&T has assumed an aggressive posture with frame relay."

The European deployment calls for AT&T to install at least one StrataCom, Inc. IPX — the switch used to support InterSpan in the U.S. — in each country. "We did this to ensure seamless

service between the networks," said Patrick-Ezzell. The StrataCom switches will be networked using multiple E-1 lines.

In Europe, customers can access the service using 64K bit/sec lines, E-1 (2.048Mbit/sec) links, and 128K and 256K bit/sec fractional T-1 links where available.

For European InterSpan customers, AT&T Istel will provide a single point of contact and consolidated billing. They can choose to be billed in U.K. pounds or U.S. dollars.

For U.S. users, AT&T Istel will provide a consolidated European bill to a foreign site or the company's U.S. headquarters.

AT&T will manage its InterSpan service from a Global Network Management Center in the U.K. — the same facility used to support the carrier's European managed data services, announced in March.

Firms with workstations that support the Simple Network Management Protocol can use a permanent virtual circuit to access raw service data that is stored in an internally developed frame re-

AT&T frame relay goes overseas

AT&T's InterSpan service will be available by year end through 90 points of presence (POPs) in the following countries:

- Belgium
- France
- Germany
- Netherlands
- Spain
- Sweden
- U.K.

InterSpan is currently available through 100 POPs in the U.S.

SOURCE: AT&T, BASKING RIDGE, N.J.
GRAPHIC BY SUSAN J. CHAMPENY

lay Management Information Base, Patrick-Ezzell said.

In addition, AT&T provides weekly and monthly network configuration, utilization and exception reports on-line that enable network managers to optimize their frame relay nets and identify problems.

AT&T offers InterSpan frame relay service to users under private contract. The carrier charges users a flat fee for the service, but Patrick-Ezzell declined to discuss further pricing details. ■

right direction."

Chris Stormont, director of net application services at Bank of Boston Corp., said Spyder will open up a wider market for Soft-Switch. Although the bank has Soft-Switch Central and is not interested in using Spyder right away, he said, "As a Soft-Switch customer, I like to see the company broadening its base and becoming entrenched as a long-term player in the market."

David Atlas, a product marketing manager at Beyond, Inc., a Cambridge, Mass., maker of mail-enabled applications, said Soft-Switch's introduction of Spyder signals a recognition that E-mail downsizing is for real.

"There is no comparison between the cost of running E-mail on a mainframe vs. a LAN," Atlas said. "We have some accounts that have said to run [IBM's mainframe-based Professional Office System] costs anywhere from \$50 to \$200 per user per month because of the maintenance and licensing fees, whereas LAN E-mail might cost \$100 per user forever." ■



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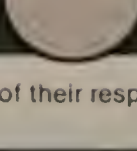
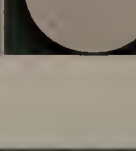
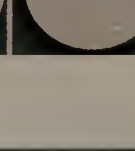
In addition to the "standards," UDS offers a suite of features—automatic dial back-up, remote configuration capability, call security etc.—that is simply not available in competitive models.

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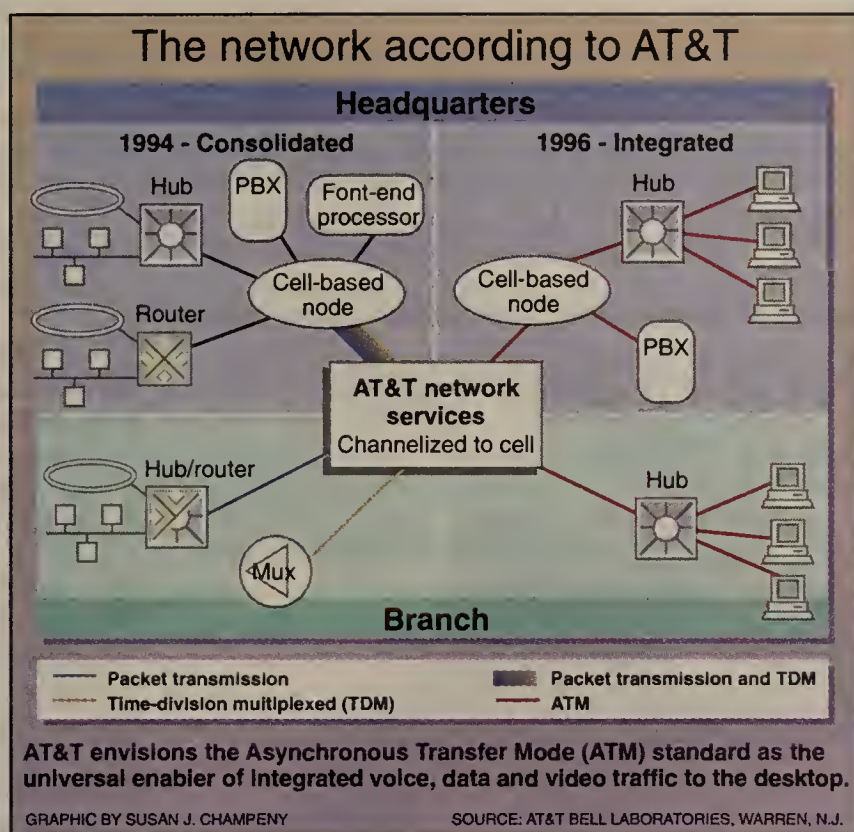
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DATA NET ARCHITECTURES

NETWORK ARCHITECTURES, DATA NETWORK EQUIPMENT, STANDARDS AND ENTERPRISE NETWORK MANAGEMENT

Worth Noting

Last year, 2.1 million personal computers in the U.S. were connected to a mainframe via IBM 3270 or compatible coaxial cable emulation boards, and 428,000 of those boards were shipped during that time, according to a report from International Data Corp., a market research firm in Framingham, Mass.



AT&T looks to migrate users to ATM equipment

Stops short of pledging upgrade to current wares.

By Jim Duffy
Senior Editor

LA JOLLA, Calif. — AT&T has formed an internal task force to establish product development and marketing strategies aimed at migrating its data networking customer base to Asynchronous Transfer Mode (ATM) switching.

AT&T is looking to equip the next generation of its enterprise-wide networking gear — switches, multiplexers, private branch exchanges, hubs, routers and workstation adapters — with ATM interfaces.

At the same time, the carrier is evolving its public network to support cell-based transmissions instead of channelized, time-division multiplexed-based transmission techniques (see graphic, this page).

Although AT&T acknowledged the importance of ATM, it stopped short of committing to support the technology in its current product line. Users, therefore, have no assurance from the vendor that any products they buy today will support features they might need down the road.

The task force includes officials from AT&T's various business units, including NCR Corp., AT&T Paradyne and AT&T Network Systems. It is chartered with devising a plan for implementing ATM throughout users' enterprise networks so voice, data and video traffic can be integrated

over the same wide-area circuits and delivered to users' desktops.

The task force will accomplish this by leveraging the telecommunications giant's expertise in several areas, such as cell relay technology, network services, and local- and wide-area networking product development.

"We are no longer in a position for each business unit to pursue opportunities in a vacuum," said Bill Toth, AT&T product manager for data networking.

ATM is regarded as the key technology for integrating the myriad of products and services that AT&T offers and for delivering integrated voice, data and video to users' desktops, AT&T officials said at a Network Users Group-AT&T (NUGATT) meeting here two weeks ago.

Because it is a standard, ATM is designed to foster interoperability between not only AT&T's equipment, but also gear from other vendors. And because it is a cell relay-based technology, ATM can perform simultaneous transmission of data, video, image and voice at 45M bit/sec and above, with low transmission delay.

Currently, AT&T's customer premise platform for wide-area networking is the Broadband Networking System-1000 (BNS-1000), a fast packet backbone switch with a cell-based architecture that supports frame relay.

(continued on page 14)

Sprint Int'l releases frame relay switches

New TP4900 F-Series switches are designed to be used by carriers and on private user networks.

By Bob Brown
Senior Editor

ATLANTA — Sprint International last week announced a series of frame relay packet switches designed for both private and public networks, including Sprint Corp.'s own service.

Sprint International's new TP4900 F-Series switches are similar to the existing TP4900 packet switches but have been stripped of X.25 and other non-frame relay features.

Alan Taffel, director of product marketing at Sprint International, said the switches will be positioned against existing offerings from companies such as Northern Telecom, Inc., StrataCom, Inc. and start-up Cascade Communications Corp.

Existing TP4900 switches have not provided much competition to those geared specifically for frame relay nets because the TP4900 is designed to do much more than frame relay and is priced accordingly, he said.

"StrataCom has had free reign

over the private frame relay network market until now," Taffel said. "We have the largest market share in the packet equipment market and intend to do the same with frame relay."

The TP4900 F-Series switches, which are based on Motorola, Inc.'s 68030 microprocessors, provide from 7M to 40M bit/sec of throughput and feature a 400M bit/sec bus. According to the company, the switches achieve the throughput by transmitting packets of various lengths with no more than six bytes of overhead, as opposed to sending data in fixed-length cells, which can result in carrying almost all overhead and no other data, depending on traffic patterns.

"We've got the low-delay characteristics of cell-based switches," Taffel said. "But we don't have all that overhead or wasted bandwidth."

The switches come in five models ranging in size from five to 28 T-1/E-1 ports on the net-

(continued on page 21)

NetLabs is one-stop shop for mgmt. applications

By Michael Cooney
Senior Editor

LOS ALTOS, Calif. — Setting itself up to be a one-stop OEM shop for multivendor net management applications, NetLabs, Inc. has announced a program to give users easy access to applications built by various vendors for its standards-based management system.

Under the NetLabs Application eXchange (NAX) program, NetLabs will produce a catalog of applications written to its NetLabs/Manager platform by supporting vendors. Users can pick and choose the applications they need for their specific environments and buy them directly from NetLabs.

Users will have access to management applications from 12 vendors, including AT&T/NCR Corp., Control Data Corp., Gan-

dalf Systems Corp., Independence Technologies, Inc. and Siemens Nixdorf Informationsysteme AG.

NAX vendors will develop vendor-specific and generic net management applications, such as automatic recovery or trouble-ticketing applications, and offer them on top of the NetLabs/Manager platform.

NetLabs/Manager, previously named DualManager, is resold by NAX vendors under various names. It monitors net performance and provides configuration information that customers can use to control and maintain large or small multivendor nets.

The software supports the Simple Network Management Protocol and Common Management Information Protocol over Transmission Control Protocol/

(continued on page 14)

Data Packets

Network Software Associates, Inc. last week brought out a new version of its DynaComm/Elite 3270 terminal-emulation software that includes a number of new features, such as improved performance and support for Novell, Inc. Systems Network Architecture gateways.

DynaComm/Elite 3.3 runs under Microsoft Corp.'s Windows 3.0 or 3.1. The new version features faster screen updates, easier configuration and operation, dial-up asynchronous connectivity and support for Microsoft's TrueType font feature, which matches screen display with printer output.

DynaComm/Elite 3.3 can also be used with Novell's NetWare SNA Gateway and NetWare for SAA. A session-splitting feature on the software allows users to establish sessions with multiple IBM hosts through various Novell gateways.

Version 3.3 costs \$495 and will be available this month.

Digital Communications Associates, Inc. last week announced a new family

(continued on page 14)

AT&T to migrate users to ATM

continued from page 13

Although switching of ATM cells is in the BNS-1000's "evolution," AT&T officials would not sign off on it as the strategic platform for delivering ATM to the customer premise.

"We're evaluating what the right architecture is," Toth said.

AT&T is nonetheless pressing users of its Information Systems Network (ISN) switches to migrate to the feature-rich but

more expensive BNS-1000.

ISN provides campuswide Ethernet bridging and terminal-to-host connections over serial lines.

As a result, users at the NUGATT conference were not ready to buy into AT&T's hard sell of the BNS-1000 because there was no guarantee that they would not have to buy another switch in three to five years to take advantage of ATM.

That is what ISN users are experiencing right now with frame relay. To take advantage of that technology, the users have to purchase the BNS-1000.

"I would see something like that happening with ATM," said James Dominick, network operations manager at Wake Forest University's computer center in Winston-Salem, N.C. "I would go with the BNS-1000 if I knew it was going to be the platform for the future. But it wouldn't surprise me if they made you buy a new box."

Richard Loudon, telecommunications analyst for data communications at AMAX, Inc. of Indianapolis, added, "I don't recall them saying what the platform was [for ATM.] I didn't get a feeling that [the BNS-1000] was a real set direction." ■

Data Packets

continued from page 13

of Irma graphical terminal-emulation software for DOS, Apple Computer, Inc. Macintosh and Microsoft Corp. Windows workstations that packages support for IBM's Graphical Data Display Manager, IBM's mainframe package for creating and displaying on terminals graphic data such as pie charts and bar graphs. The new programs include mouse support.

All three packages are available for \$295 each. A gateway version is also available for \$2,995.

Datability, Inc. has teamed up with Netlink, Inc. to develop a gateway that connects users of Digital Equipment Corp. terminals on Transmission Control Protocol/Internet Protocol local-area networks to IBM Systems Network Architecture networks.

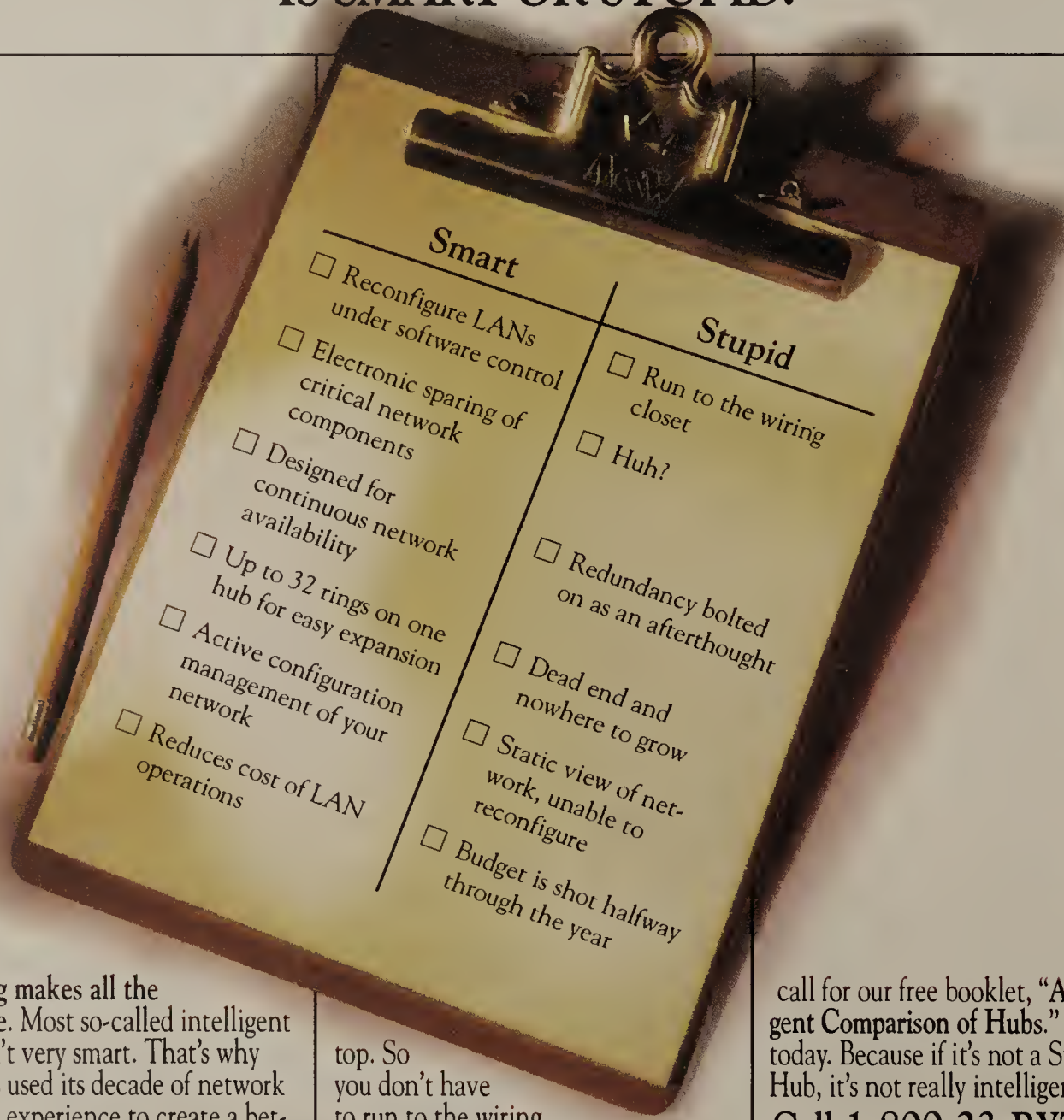
The new 3270 Cluster Controller Line Card will reside in Datability's existing VCP 1000 Communications Server terminal server chassis and use Netlink's SNA connectivity software.

The 3270 Cluster Controller Line Card allows the VCP 1000 to connect to an IBM 3745 or 3725 front-end processor over a Synchronous Data Link Control line and emulate an IBM 3174 or 3274 cluster controller. It supports as many as 32 simultaneous users and converts 3270 screen sequences to DEC VT terminal screen sequences so DEC terminal users can use familiar commands to establish sessions with an IBM host.

As many as four of the gateway cards can be installed in a single VCP 1000 chassis.

The card is priced at \$5,999 and will be available in July. ■

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NetLabs is one-stop shop for mgmt.

continued from page 13

Internet Protocol. It runs on Unix workstations from IBM, Intergraph Corp., MIPS Computer Systems, Inc., NCR, Siemens Nixdorf and Sun Microsystems, Inc.

NetLabs/Managers can be interconnected to support distributed network management environments. It comes in two versions: one supporting 100 devices and another supporting 1,000 devices.

Analysts said the NetLabs software and NAX program will be practical for users because the solution does not tie them to one vendor or one particular type of hardware.

"Users also say the NetLabs system is technically sound and offers more features than a Sun or HP management platform," said Michael Howard, president of Infonetics Research, Inc. in San Jose, Calif.

Howard said the NetLabs/Discover feature, for example, is more powerful than similar features offered with other net management platforms. It is a net mapping tool that automatically determines what devices are on the net and reports back topological data to the NetLabs/Manager. Discover can search the entire net or specific subnets.

From the Discovery data, net managers can monitor changes in their networks and make adjustments before problems occur, the company said. ■

LOCAL NETWORKING

LAN HARDWARE, NETWORK OPERATING SYSTEMS AND LAN MANAGEMENT

Worth Noting

“Users are gobbling up database [NetWare Loadable Modules].”

Stuart Woodring
Director of software
strategy research
Forrester Research, Inc.
Cambridge, Mass.

Netnotes

Digital Communications Associates, Inc. (DCA) of Alpharetta, Ga., last week announced support for 16M bit/sec token-ring transmission over unshielded twisted-pair cabling and released two new token-ring multistation access units (MAU).

The 16M bit/sec over unshielded twisted-pair support is provided through a new Irmatrac adapter card or a new Ring Interface Module (RIM) for the company's existing Irmatrac Token-Ring Adapter Convertible network interface cards. In other words, existing customers do not have to purchase a new card in order to achieve the higher throughput, just a new RIM for their existing cards.

“Because upgrading Irmatrac to support 16M bit/sec over unshielded twisted pair is as simple as purchasing a new RIM, DCA is protecting the customer's hardware investment as new technologies become available,” said Gerald Buran, vice-president of sales and marketing for DCA.

The new MAUs — the Irmatrac Token-Ring MAU UTP and Irmatrac Token-Ring MAU STP — are passive units that each have eight ports and support 4M and 16M bit/sec transmission over unshielded and shielded twisted-pair cabling, respectively.

The new Irmatrac token-ring adapter card is available now for \$895. Existing customers can upgrade to the new RIM for \$195. The Irmatrac MAUs will be available later this month for \$575. ■

Madge Networks to release SmartCAU intelligent hub

Offering signals company's entry into new mart.

By Caryn Gillooly
Senior Editor

SAN JOSE, Calif. — Known primarily as a token-ring adapter card vendor, Madge Networks, Inc. this week is expected to enter the intelligent hub market with the release of an IBM-compatible token-ring concentrator.

Although the intelligent hub market is currently dominated by companies such as SynOptics Communications, Inc., Madge Networks' concentrator — called the SmartCAU — is token ring-specific, putting Madge Networks' offering in direct competition with IBM's 8230 controlled access unit (CAU).

“IBM dominates the token-ring concentrator business; they've got something like 66% of the market,” said Martin Taylor, product marketing manager for Madge Networks, based here. That is why his company designed its first intelligent hub to resemble IBM's intelligent hub architecture and to be completely compatible with it.

The SmartCAU is a four-port

intelligent wiring concentrator for linking workstations to a 4M or 16M bit/sec token-ring backbone. The ports are configured to support shielded twisted-pair connections, although users can buy Madge Networks' Fiber Trunk Link Module — also to be announced this week — to attach the hub to a fiber-optic backbone.

The four ports support individual devices, such as servers, workstations or bridges. More likely, however, they will be used to support Madge Networks' SmartLAM lobe attachment modules, or LAMs, which are also expected to be announced this week. Each SmartLAM supports as many as 20 workstations, meaning any one SmartCAU can support as many as 80 workstations.

The first LAM to be rolled out, the SmartLAM/STP, supports shielded twisted-pair connections. Taylor said an unshielded twisted-pair LAM is scheduled for release by year end.

The IBM compatibility enters
(continued on page 16)

UB enhances support for NetWare NOS

By Margie Wylie
Senior Editor

WASHINGTON, D.C. — After practically ignoring the leading LAN operating system for years, Ungermann-Bass, Inc. decided to increase its support for Novell, Inc.'s NetWare, company officials said earlier this month at INTEROP 92 Spring here.

The company pledged to work with Novell to integrate its network management software with NetWare administration tools and is considering licensing NetWare Runtime to ship with Ungermann-Bass' recently announced Access/Open hub add-on. Users currently must buy the NetWare operating system separately.

Access/Open, announced earlier this month and due out in volume in August, is essentially a personal computer that can ac-

cept three processors and is integrated with Ungermann-Bass' network management software (“Vendor trio positions hubs as LAN servers,” NW, May 11).

The server connects to the Access/Open hubs through a standard local-area network connection such as Ethernet. This offers users superior physical security because the hubs to which the Access/Opens are tethered are generally locked in closets and the server's console can only be accessed through Ungermann-Bass' NetManage.

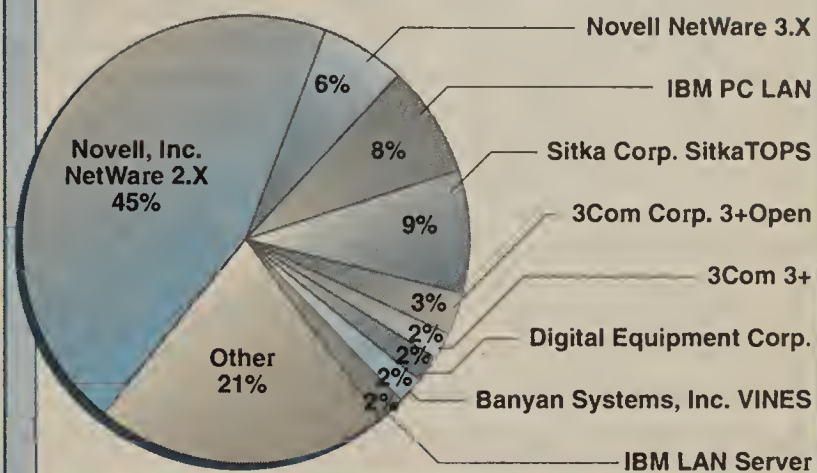
Access/Open, which offers integrated hardware management, also lightens the load for LAN network servers and nodes by freeing them from running some network applications.

Starting at \$7,990 with one Intel Corp. 80386 processor, the chassis offers users the equivalent of three Intel 80386s or 80486s running in a single box.

Users can run the operating systems and applications of their choice on each processor. For example, IBM's OS/2 and Lotus Development Corp.'s Notes could
(continued on page 17)

Western European PC LAN operating systems snapshot

Total 1990 licenses shipped: 125,200



GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

Studies find Europe is buying into LANs

Local-area network installations on the rise in Western Europe as prices drop, market matures.

By Margie Wylie
Senior Editor

MOUNTAIN VIEW, Calif. — Declining prices and a maturing local-area network market are encouraging Western Europeans to install more LANs, a trend that will cause the European LAN market to grow slightly faster than the domestic market, two recently released studies found.

According to International Data Corp. (IDC), a research company in Framingham, Mass., the European LAN market will nearly double from \$3.8 billion in 1991 to \$7.3 billion by 1995, a compound annual growth rate of 17.6%. Market Intelligence Research Corp., based here, predicted a slightly higher growth rate of 18.1% (see graphic, page 17).

“Europe is a very healthy and large market,” said Lee Doyle, director of worldwide LAN research at IDC.

But he predicted the growth in Europe will be at the expense of the U.S. The domestic market, which accounted for 55.6% of the world LAN market in 1991, will drop to 44.9% by 1995, according to the IDC report. Europe's share is expected to grow from 31.5% in 1991 to 32.3% in 1995.

In the context of a rapidly expanding worldwide market, these results come as no surprise, the studies say. However, other factors beyond world economics are fueling the trend, said Hilary Mine, research manager for Mar-

ket Intelligence Research.

“Probably the No. 1 reason is that prices are dropping,” said Mine, who estimated that as little as a year ago, the typical LAN installation cost Western European buyers more than twice as much as their U.S. counterparts. Because many of the components of LANs came from Japan or the U.S., they were subject to higher taxes by European countries trying to foster growth of their own high-tech industries, Mine said.

Homegrown European LAN vendors are beginning to hit their stride with better products, lower manufacturing costs and improved distribution channels, she said. But those companies are also facing increasing competition from many overseas LAN vendors, another factor that is driving prices down.

“I would say Japan and the U.S. have been moving very hard into Europe because of the [formation of the] European Economic Community. They don't want to be left out,” she said.

Technological leapfrog

Personal computers and PC networks are not as ubiquitous in Europe as in the U.S. but are catching up quickly, Mine said. By the end of this year, 52% of all PCs in the U.S. will be connected to LANs while only 42% of European PCs will be linked locally, according to IDC's Doyle.

(continued on page 17)

Auspex doubles high-end Unix server's power

By Caryn Gillooly
Senior Editor

WASHINGTON, D.C. — Superserver vendor Auspex Systems, Inc. has brought out a new high-end Unix server it claims offers nearly twice the throughput of its previous offering for the same price.

Called the Auspex NetServer (NS) 5500, the machine can support as many as eight separate Ethernet local-area networks and can process more than 2,250 Network File System I/O operations per second. That number is 30% to 50% great-

er than the throughput offered by the previous NS 5000 version, according to Leslie Chow, NS 5500 product manager for Auspex, based in Santa Clara, Calif.

Both the new and existing NetServers operate using Auspex's Functional Multi-Processor (FMP) architecture. FMP provides multiprocessing capabilities by allocating to specialized processors the network, file and disk management tasks usually performed by a server's Unix CPU.

The NetServers can be configured with as many as four Ethernet processors supporting up to eight Ethernet networks, two

file processors and three storage processors with as many as 30 Small Computer System Interface I/O channels and 81G bytes of disk storage, all in addition to the Unix host processor.

The greater throughput in the new machine is achieved through the inclusion of upgraded Ethernet and file processors. The NS 5500 uses Motorola, Inc.'s 40-MHz 68030 processors with 16Mbytes of cache, while the NS 5000 uses the 20-MHz 68030s with 4M bytes of cache.

According to Auspex, one of the advantages of the new machine, introduced at

the recent INTEROP 92 Spring trade show here, is that the additional processing power is available at no extra cost.

The new machine costs \$124,900, the same as the NS 5000, and is available as a field upgrade for existing customers for about one-tenth of that price.

The NS 5500 is available now. It is priced at \$124,900 with a standard base configuration or at \$149,900 configured with the redundant power supply option. Upgrades for installed NS 5000 machines cost \$10,900 for the file processor and \$12,900 for the Ethernet processor. ■

Madge to release intelligent hub

continued from page 15

the picture in that IBM's 8230 CAU can be used with Madge Networks' LAMs and Madge Networks' SmartCAU can support IBM's LAMs. "You can mix and match any of these pieces," Taylor said.

In addition to the IBM compatibility, the SmartCAU will ship preconfigured with network management software that will let users remotely manage both the SmartCAU and the IBM 8230 CAU. The product also offers automatic detection, location and isolation of network faults.

The management software consists of two applications: the SmartCAU Control Program, for DOS-based administrator workstations, and TrueView CAU Manager, for Microsoft Corp. Windows-based administrator workstations. Both products provide the administrator with a configuration of the Madge Networks and IBM CAUs on the net, although TrueView will provide this information graphically.

In a future release, TrueView will be able to work in conjunction with Hewlett-Packard Co.'s OpenView network management system, Taylor said.

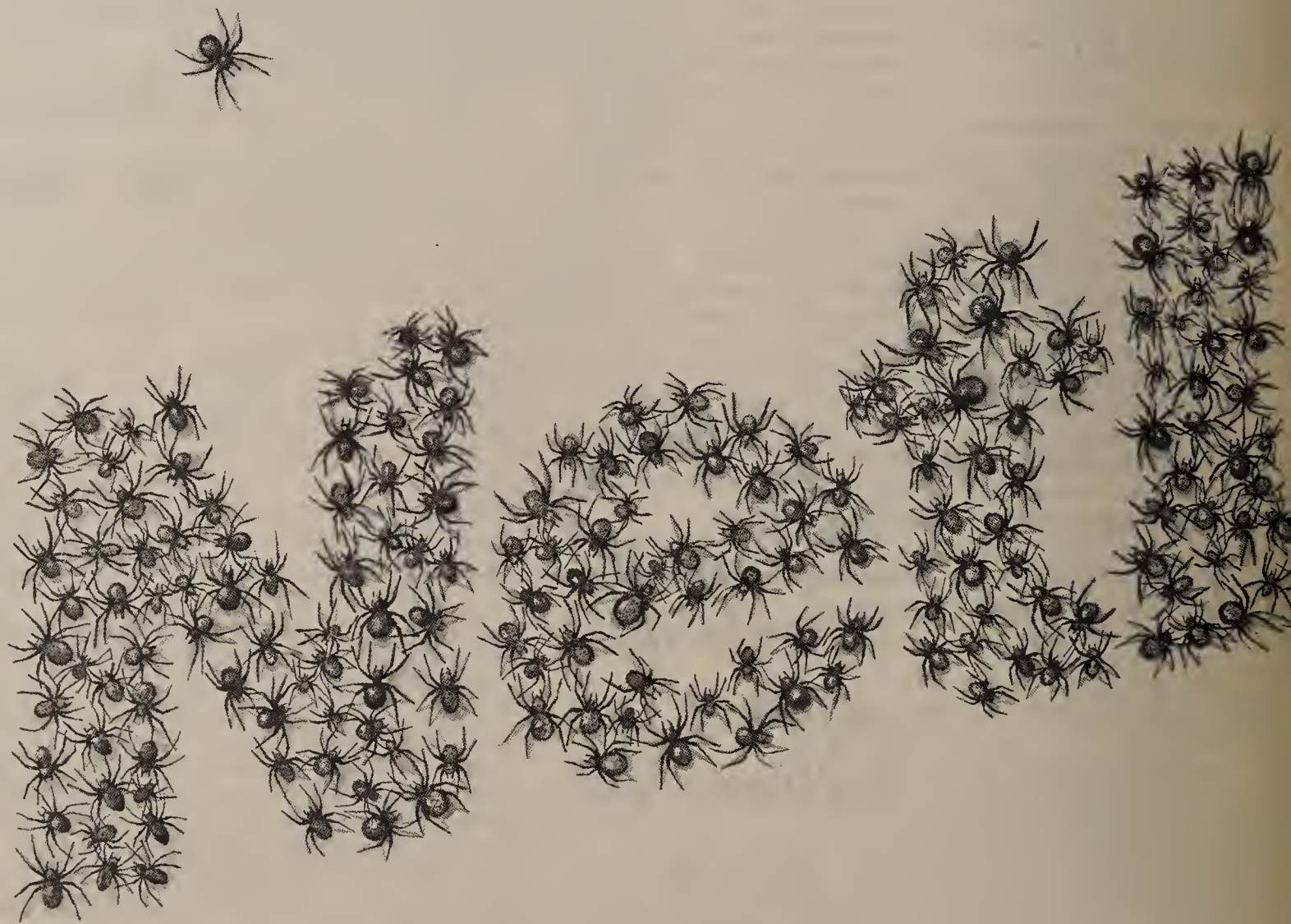
The SmartCAU also offers fault recovery capabilities. For instance, the product offers Dual Reconfiguring Ring capabilities, as specified in the token-ring standard, that lets the system automatically switch to a backup ring path without network interruption if the initial path fails.

This week, Madge Networks will also bring out a new local token-ring bridge, called the Smart Ringbridge. The bridge can forward up to 12,500 packet/sec between two token-ring nets and will support both 4M and 16M bit/sec environments, according to the company.

As with the SmartCAU, the bridge comes with network management software that lets administrators manage it remotely from a PC workstation connected to the ring. Both the SmartCAU and Smart Ringbridge can also be managed by IBM's LAN Network Manager.

All products are set to be available in August. The SmartCAU will cost \$2,995, the SmartLAM/STP will cost \$1,995, the Fiber Trunk Link Module will cost \$1,195 and the Smart Ringbridge will cost \$6,995. ■

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Circle Reader Service #121

Studies find Europe is buying into LANs

continued from page 15

Paradoxically, the average number of nodes per LAN in Europe is declining as LANs come into use across all sectors.

"In the U.S., people install PCs and then string them together into LANs. In Europe, they are installing LANs," Mine said. "In many cases, especially in Spain, where there is so little installed base, they are technologically leapfrogging us by going straight to fiber networks." She expects

this will give European LANs an edge.

According to the Market Intelligence Research study, Spain is expected to post the highest growth rates because it is the furthest behind of the Western European countries in LAN installations.

After reunification with its technology-starved Eastern half, Germany is expected to run a close second, according to Mine.

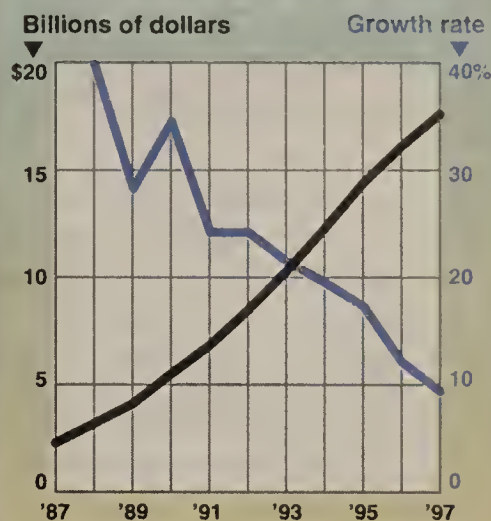
Both studies focus on Western European countries, the authors said, because without PCs, there can be no PC LANs.

"The LAN market in Eastern Europe is extremely small. Their development is go-

ing to concentrate on PCs before they move into a LAN phase," Doyle said, predicting the emergence of an Eastern European LAN market in about five years.

The Eastern Europeans who do have PCs today will have problems in the future finding a LAN operating system in their native language, according to Doyle. The majority of the leading LAN system menus, command structures and documentation are translated into German, French, Italian and Spanish, but users would be hard pressed to find them in Bulgarian or Croatian. **■**

Western Europe's PC LAN revenue forecast



SOURCE: MARKET INTELLIGENCE RESEARCH CORP., MOUNTAIN VIEW, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

UB enhances support for NetWare NOS

continued from page 15

run on one processor while Novell's NetWare and the NetWare Access Server run on another.

In the future, however, Ungermann-Bass said it hopes to integrate its own NetDirector, a Simple Network Management Protocol-based management program, more closely with NetWare's management, allowing users to administer NetWare server software, its associated NetWare Loadable Module (NLM) applications, the Access/Open server and the Access/One hub from a single system.

Ungermann-Bass seems to be betting that NetWare is going to be an important platform for enterprise applications.

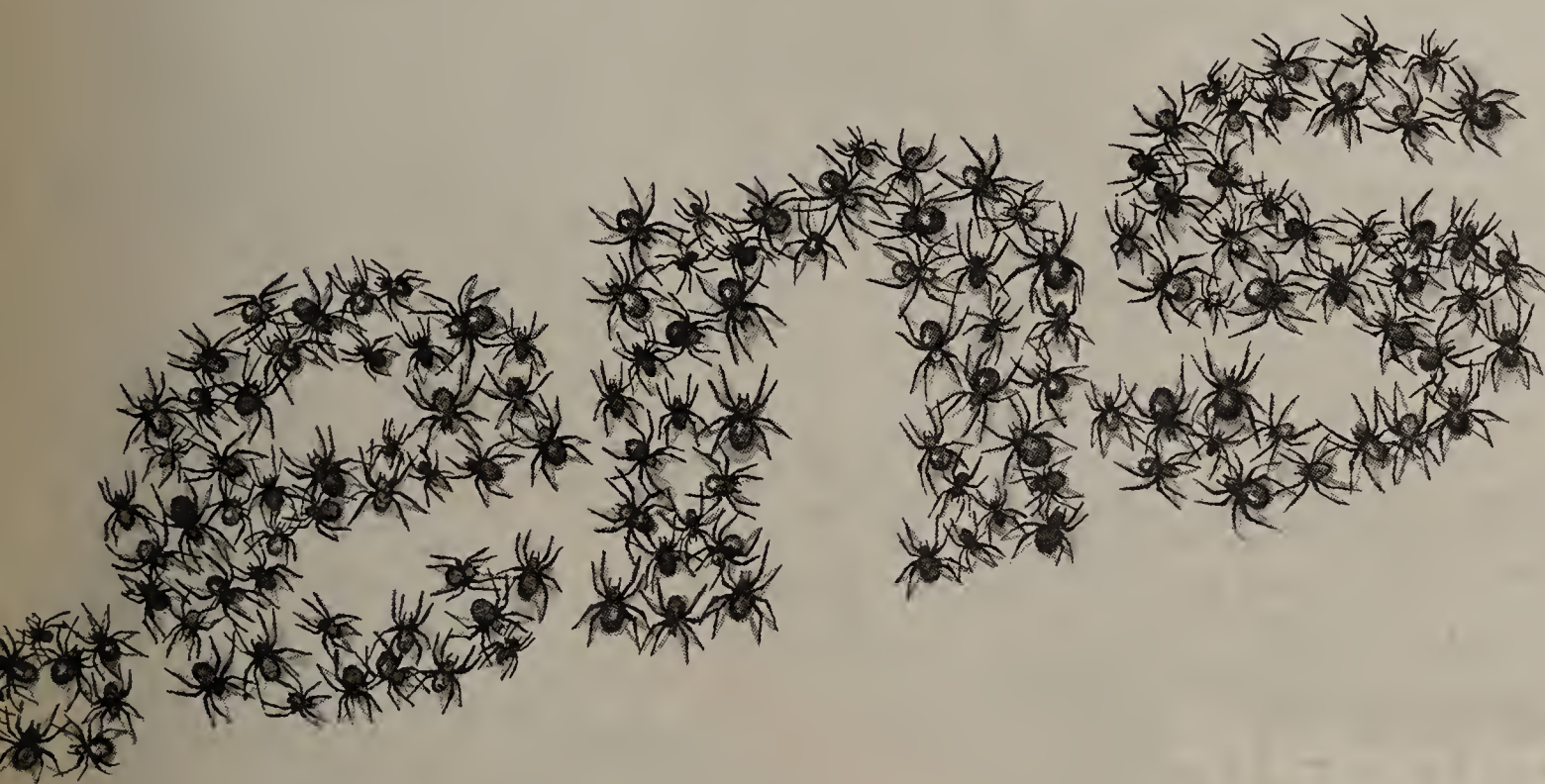
"Most of the [enterprise] applications are NLMs, but all of them can be," said a spokesman for the vendor. For example, the Lotus Notes groupware server runs on OS/2 today but will soon be available as an NLM running on NetWare.

Ungermann-Bass is also considering licensing NetWare Runtime to ship with the Access/Open. NetWare Runtime is Novell's base operating system minus NetWare's file and print services. The software lets users run NLM-type applications in a server on a network even if the rest of the network does not use NetWare. Irving, Texas-based NetWorth, Inc. earlier this month became the first company to license and ship NetWare Runtime with its hubs.

Shipping NetWare Runtime with Access/Open would be a more economical solution from a user's point of view but not necessarily from Ungermann-Bass', said Jodi Mardesich, a San Francisco-based analyst with The Burton Group, an industry consulting firm based in Salt Lake City.

"Novell has had Runtime out since January or February and has only had one taker," she said. "That makes us think Novell is asking vendors for too much money."

Users that want to base an Access/Open application server on NetWare are currently forced to buy either a five-user version of Novell's NetWare Version 3.11 for \$1,495 or the NetWare Multiprotocol Router, which ships with NetWare Runtime for \$995. Users cannot buy NetWare Runtime directly from Novell, which will only license it to application vendors. **■**



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12. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
13. ☐ Government State/Local
14. ☐ Government Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (Independent)
18. ☐ Carriers
19. ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/Systems House
22. ☐ Distributor, Computer Related
23. ☐ Distributor, Communications Related
24. ☐ Other

2 What is your job function? (check one only)

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 2. ☐ LAN Mgmt
 3. ☐ Datacom/Telecom Mgmt
 4. ☐ Engineering Mgmt

MIS MANAGEMENT

5. ☐ MIS, IS, IT, Mgmt
6. ☐ Engineering Mgmt

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9. ☐ Other

3 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1

4 Check all that apply in columns A and B:

- A: I am involved in the purchase of the following products/services.
B: I plan to purchase the following products/services in the next 12 months.

Involved	Plan to Purchase	A	B
LOCAL-AREA NETWORKS			
01.	<input type="checkbox"/>	<input type="checkbox"/>	Local-Area Networks
02.	<input type="checkbox"/>	<input type="checkbox"/>	LAN Servers
03.	<input type="checkbox"/>	<input type="checkbox"/>	LAN Operating Systems Software
04.	<input type="checkbox"/>	<input type="checkbox"/>	Superservers
05.	<input type="checkbox"/>	<input type="checkbox"/>	Data Base Servers (Oracle, Sybase, etc)
06.	<input type="checkbox"/>	<input type="checkbox"/>	Terminal Servers
07.	<input type="checkbox"/>	<input type="checkbox"/>	LAN Services
08.	<input type="checkbox"/>	<input type="checkbox"/>	LAN Storage Devices (Optical, Tape, Disk, Etc. including Backup Systems)
09.	<input type="checkbox"/>	<input type="checkbox"/>	Network Test Equipment
10.	<input type="checkbox"/>	<input type="checkbox"/>	Hubs
11.	<input type="checkbox"/>	<input type="checkbox"/>	Cables, Connectors, Baluns
12.	<input type="checkbox"/>	<input type="checkbox"/>	UPS
13.	<input type="checkbox"/>	<input type="checkbox"/>	Network Adapter Boards
14.	<input type="checkbox"/>	<input type="checkbox"/>	Central Office LANs
15.	<input type="checkbox"/>	<input type="checkbox"/>	Wireless LANs
16.	<input type="checkbox"/>	<input type="checkbox"/>	SNMP Network Management
INTERNETWORKING			
17.	<input type="checkbox"/>	<input type="checkbox"/>	Bridges
18.	<input type="checkbox"/>	<input type="checkbox"/>	Routers
19.	<input type="checkbox"/>	<input type="checkbox"/>	Gateways
20.	<input type="checkbox"/>	<input type="checkbox"/>	Bridge/Router
21.	<input type="checkbox"/>	<input type="checkbox"/>	Hubs
22.	<input type="checkbox"/>	<input type="checkbox"/>	Intelligent Hubs
23.	<input type="checkbox"/>	<input type="checkbox"/>	Communications Servers
COMPUTERS/PERIPHERALS			
24.	<input type="checkbox"/>	<input type="checkbox"/>	Micros/PCs

5 What are your primary responsibilities? (check all that apply)

1. ☐ LANs
2. ☐ Internetworking
3. ☐ WANs

6 What is the scope of your involvement in purchase decisions for Network products & services? (check one only)

1. ☐ Enterprisewide (Organization/Subsidiary/Division)
2. ☐ Multienterprise (Consultants)
3. ☐ Departmentwide

7 Is your network: (check all that apply)

- LOCAL AREA NETWORKS**
1. ☐ Local (within building)
 2. ☐ Local (in a campus environment)

WIDE AREA NETWORKS

3. ☐ International
4. ☐ National
5. ☐ Regional (several states)
6. ☐ Metropolitan

8 Which of the following network architectures/protocols are used? (check all that apply)

01. ☐ SNA
02. ☐ DECNET
03. ☐ OSI
04. ☐ GOSIP
05. ☐ MAP/TOP
06. ☐ TCP/IP
07. ☐ DCA (Unisys)
08. ☐ X.25
09. ☐ NOVELL IPX/SPX
10. ☐ APPC/APPN/LU 6.2
11. ☐ NETBIOS
12. ☐ DEC LAT
13. ☐ APPLE TALK
14. ☐ OTHER

9 What is your LAN Operating System? (check all that apply)

01. ☐ LOCAL TALK (APPLE TALK)
02. ☐ BANYAN (VINES)
03. ☐ DCA (IRMA LAN)
04. ☐ IBM (LAN SERVER)
05. ☐ IBM (PC LAN PROGRAM)
06. ☐ MICROSOFT (LAN MANAGER)
07. ☐ UNGERMANN-BASS
08. ☐ NOVELL (NETWARE, 2.X, 3.X)
09. ☐ PROTEON (PRONET)
10. ☐ SITKA (TOPS)
11. ☐ 3COM (3+, 3+ OPEN)
12. ☐ Other

A. I Wish to Receive a FREE Subscription to Network World.

YES ☐ NO ☐

Signature _____ Date _____

Business Phone _____

B. Please Provide your Name, Title & Company Address.

DR./MR./MRS./MS. _____
First Name Middle Name Last Name

TITLE _____

COMPANY NAME _____

DIVISION/DEPARTMENT _____

STREET ADDRESS _____

CITY _____ STATE _____ ZIP _____

Must answer questions 1-18.

Sign and Date the Form to Apply.

Pass-Along Qualification Form

25. <input type="checkbox"/>	<input type="checkbox"/>	Minis	58. <input type="checkbox"/>	<input type="checkbox"/>	Protocol Converters
26. <input type="checkbox"/>	<input type="checkbox"/>	Mainframes	59. <input type="checkbox"/>	<input type="checkbox"/>	Network Management Systems
27. <input type="checkbox"/>	<input type="checkbox"/>	Laptops	60. <input type="checkbox"/>	<input type="checkbox"/>	Terminal Emulation Boards
28. <input type="checkbox"/>	<input type="checkbox"/>	Workstations	61. <input type="checkbox"/>	<input type="checkbox"/>	Diagnostic/Test Equipment
29. <input type="checkbox"/>	<input type="checkbox"/>	Image Processing Workstations	62. <input type="checkbox"/>	<input type="checkbox"/>	DSU/CSU
30. <input type="checkbox"/>	<input type="checkbox"/>	Front-End Processors	63. <input type="checkbox"/>	<input type="checkbox"/>	Data Compression Equipment
31. <input type="checkbox"/>	<input type="checkbox"/>	Terminals	64. <input type="checkbox"/>	<input type="checkbox"/>	Microwave
32. <input type="checkbox"/>	<input type="checkbox"/>	Printers	65. <input type="checkbox"/>	<input type="checkbox"/>	Fax Boards
33. <input type="checkbox"/>	<input type="checkbox"/>	Cluster Controllers	66. <input type="checkbox"/>	<input type="checkbox"/>	VSAT
34. <input type="checkbox"/>	<input type="checkbox"/>	Fax Machines	67. <input type="checkbox"/>	<input type="checkbox"/>	Fiber Optic
A B SOFTWARE		68. <input type="checkbox"/>	<input type="checkbox"/>	Satellite	
35. <input type="checkbox"/>	<input type="checkbox"/>	Network Management	69. <input type="checkbox"/>	<input type="checkbox"/>	ISDN
36. <input type="checkbox"/>	<input type="checkbox"/>	Micro to Mainframe	70. <input type="checkbox"/>	<input type="checkbox"/>	PBXs (over 1000 lines)
37. <input type="checkbox"/>	<input type="checkbox"/>	Network Security	71. <input type="checkbox"/>	<input type="checkbox"/>	PBXs (200 - 1000 lines)
38. <input type="checkbox"/>	<input type="checkbox"/>	Call Accounting	72. <input type="checkbox"/>	<input type="checkbox"/>	PBXs (under 200 lines)
39. <input type="checkbox"/>	<input type="checkbox"/>	Communication	73. <input type="checkbox"/>	<input type="checkbox"/>	Automatic Call Distributors
40. <input type="checkbox"/>	<input type="checkbox"/>	Word Processing	74. <input type="checkbox"/>	<input type="checkbox"/>	Voice Messaging Systems
41. <input type="checkbox"/>	<input type="checkbox"/>	Data Base Management	75. <input type="checkbox"/>	<input type="checkbox"/>	Videoconferencing Systems
42. <input type="checkbox"/>	<input type="checkbox"/>	Spreadsheet	76. <input type="checkbox"/>	<input type="checkbox"/>	Central Office Switch
43. <input type="checkbox"/>	<input type="checkbox"/>	Groupware	77. <input type="checkbox"/>	<input type="checkbox"/>	Voice Response/Processing
44. <input type="checkbox"/>	<input type="checkbox"/>	EDI	78. <input type="checkbox"/>	<input type="checkbox"/>	Switched Voice
45. <input type="checkbox"/>	<input type="checkbox"/>	E-Mail	79. <input type="checkbox"/>	<input type="checkbox"/>	Dedicated Leased Line
46. <input type="checkbox"/>	<input type="checkbox"/>	Windows/Graphical User Interface	80. <input type="checkbox"/>	<input type="checkbox"/>	Digital Data
47. <input type="checkbox"/>	<input type="checkbox"/>	4-GL	81. <input type="checkbox"/>	<input type="checkbox"/>	Switched Data
48. <input type="checkbox"/>	<input type="checkbox"/>	Multimedia	82. <input type="checkbox"/>	<input type="checkbox"/>	Centrex
49. <input type="checkbox"/>	<input type="checkbox"/>	Graphics	83. <input type="checkbox"/>	<input type="checkbox"/>	On-Line Information
A B WIDE-AREA NETWORK EQUIPMENT/SERVICES		84. <input type="checkbox"/>	<input type="checkbox"/>	E-Mail	
50. <input type="checkbox"/>	<input type="checkbox"/>	Modems (9.6 kbps and over)	85. <input type="checkbox"/>	<input type="checkbox"/>	SMDS
51. <input type="checkbox"/>	<input type="checkbox"/>	Modems (under 9.6 kbps)	86. <input type="checkbox"/>	<input type="checkbox"/>	Image Processing
52. <input type="checkbox"/>	<input type="checkbox"/>	T-1	87. <input type="checkbox"/>	<input type="checkbox"/>	Audio Teleconferencing
53. <input type="checkbox"/>	<input type="checkbox"/>	T-3	88. <input type="checkbox"/>	<input type="checkbox"/>	Local Services
54. <input type="checkbox"/>	<input type="checkbox"/>	Fractional T-1	89. <input type="checkbox"/>	<input type="checkbox"/>	WATS MTs
55. <input type="checkbox"/>	<input type="checkbox"/>	Data Switches	90. <input type="checkbox"/>	<input type="checkbox"/>	International
56. <input type="checkbox"/>	<input type="checkbox"/>	Matrix Switches	91. <input type="checkbox"/>	<input type="checkbox"/>	Virtual Networks
57. <input type="checkbox"/>	<input type="checkbox"/>	Packet Switching	92. <input type="checkbox"/>	<input type="checkbox"/>	Frame Relay
			XX. <input type="checkbox"/>	<input type="checkbox"/>	None of the above

10 What is your LAN environment? (check all that apply)

1. ☐ 4M TOKEN RING
2. ☐ 16M TOKEN RING
3. ☐ ARCNET
4. ☐ ETHERNET
5. ☐ STARLAN
6. ☐ FDDI
7. ☐ LOCAL TALK
8. ☐ 10BASE-T
9. ☐ OTHER

11 Are you involved in the implementation of client/server applications?

Yes ☐ No ☐

12 Which operating system do you utilize? (check all that apply)

01. ☐ DOS
02. ☐ UNIX/XENIX
03. ☐ OS/2
04. ☐ OS/2 EX. ED
05. ☐ MVS
06. ☐ VM
07. ☐ VMS
08. ☐ NUBUS
09. ☐ WINDOWS
10. ☐ OTHER

13 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East

14 Which of the following vendors equipment do you currently have installed in your network? (check all that apply)

Vendor	Mainframes	Minis
01. DEC	<input type="checkbox"/>	<input type="checkbox"/>
02. IBM	<input type="checkbox"/>	<input type="checkbox"/>
03. AMDAHL	<input type="checkbox"/>	<input type="checkbox"/>
04. AT&T	<input type="checkbox"/>	<input type="checkbox"/>
05. BULL HNIS	<input type="checkbox"/>	<input type="checkbox"/>
06. NCR	<input type="checkbox"/>	<input type="checkbox"/>
07. DATA GENERAL	<input type="checkbox"/>	<input type="checkbox"/>
08. WANG	<input type="checkbox"/>	<input type="checkbox"/>
09. HEWLETT-PACKARD	<input type="checkbox"/>	<input type="checkbox"/>
10. PRIME	<input type="checkbox"/>	<input type="checkbox"/>
11. TANDEM	<input type="checkbox"/>	<input type="checkbox"/>
12. UNISYS	<input type="checkbox"/>	<input type="checkbox"/>
13. CONTROL DATA	<input type="checkbox"/>	<input type="checkbox"/>
14. OTHER	<input type="checkbox"/>	<input type="checkbox"/>

15 Please indicate the number of Microcomputers/Workstations:

- A. Presently installed in your network.
B. The approximate quantity you plan to install in the next 12 months.

Micros/Workstations	Presently Installed	Plan to Install Next 12 Months
1. Macintosh		
2. PCs Based on 80586 Chips	XXXX	
3. PCs Based on 80486 Chips		
4. PCs Based on 80386 Chips		
5. PCs Based on 80286 Chips		
6. PCs Based on 8086/8088 Chips		
7. Rise-Based Workstations		
8. Unix-Based Workstations		

16 Estimated value of networking equipment and services:

- A. Which you helped specify, recommend or approved in the last 12 months?
B. Which you plan to help specify, recommend or approve in the next 12 months?

A	B
1. <input type="checkbox"/>	<input type="checkbox"/>
2. <input type="checkbox"/>	<input type="checkbox"/>
3. <input type="checkbox"/>	<input type="checkbox"/>
4. <input type="checkbox"/>	<input type="checkbox"/>
5. <input type="checkbox"/>	<input type="checkbox"/>
6. <input type="checkbox"/>	<input type="checkbox"/>
7. <input type="checkbox"/>	<input type="checkbox"/>
8. <input type="checkbox"/>	<input type="checkbox"/>
9. <input type="checkbox"/>	<input type="checkbox"/>

17 Estimated gross annual revenue of your entire company/institution: (check one only):

1. ☐ Over \$10 billion
2. ☐ \$1 to \$9.9 billion
3. ☐ \$500 to \$1 billion
4. ☐ \$100 to \$499.9 million
5. ☐ \$50 to \$99.9 million
6. ☐ \$10 to \$49.9 million
7. ☐ \$5 to \$9.9 million
8. ☐ Under \$5 million

18 Estimated number of employees for your entire corporation:

1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ Under 500

INTERNETWORKS

LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

Worth Noting

“Intelligent bridges that can perform sophisticated filtering are what I'd call bridges with a college education. They are not, however, router substitutes.”

V.C. Marney-Petix
Author of "Mastering
Internetworking"
Fremont, Calif.

Link Notes

Standard Microsystems Corp. (SMC) has announced several new products and capabilities for Simple Network Management Protocol-based management of departmental or work group local-area networks.

Among the offerings is EliteView, a Microsoft Corp. Windows-based network management application that supports SNMP and allows users to graphically view the status of the company's 3512TPi hub down to the port level. It will be available for \$295 in the third quarter.

Also introduced was PC Agent/SNMP, a new terminate-and-stay resident (TSR) utility that allows personal computers outfitted with SMC's Elite Ethernet boards to be monitored and controlled by EliteView or other SNMP-based net management systems.

For SMC adapters, PC Agent will collect and report traffic statistics as well as configuration information. For PCs, the utility will report on items such as available disk space, configuration and drive status. Available in the third quarter, PC Agent will be offered at no charge with SMC adapters.

(continued on page 21)

Vitalink increases protocol support for bridge/routers

Upgrades include new models to support FDDI.

By Skip MacAskill
Staff Writer

WASHINGTON, D.C. — Vitalink Communications Corp. has announced several enhancements and additions to its bridge/router line, including increased protocol support and new models that support FDDI.

Vitalink, a wholly owned subsidiary of Network Systems Corp., bolstered its 6000 Series of Reduced Instruction Set Computing-based bridge/routers with support for two additional serial link protocols and two Digital Equipment Corp. standards.

The 6000 line, which consists of the 6400, 6600 and 6800, will now support the Point-to-Point Protocol (PPP), which specifies a standard format for sending information from router to router. Previously, PPP support was only available on the 6600.

Support for the Vitalink Communications Protocol (VCP) — the company's proprietary data link-layer protocol used to establish bridge/router connections

with other Vitalink devices — was also extended to the entire 6000 line. VCP bridging support had only been available on the 6600, as well.

Full PPP and VCP support will be available for the entire product line in the third quarter.

The company also added support for a DEC version of the Spanning Tree Protocol, which differs slightly from the IEEE standard, to the entire line.

Support for the DECnet Phase IV routing protocol was added to the 6600. The 6400 and 6800 had previously supported the protocol, as well as the Transmission Control Protocol/Internet Protocol, Novell, Inc.'s Internetwork Packet Exchange (IPX) and Apple Computer, Inc.'s AppleTalk Phase II.

Additionally, four new models in the 6600 suite will support Fiber Distributed Data Interface links.

The 6612 will provide one FDDI link and support two Ether-

(continued on page 20)

NAT builds bridging and host security into router

By Maureen Molloy
Senior Writer

CAMPBELL, Calif. — Network Application Technology (NAT) last week said it will add host security and bridging capabilities to its remote TCP/IP router, thereby enabling it to be configured as a bridge/router.

With the addition of host security, the LANB/280 can restrict access to hosts, desktops and applications by filtering packets on the basis of such criteria as Transmission Control Protocol port number and Internet Protocol address.

The host security feature can block unauthorized access to applications on any server based on the source node's IP address and the server's TCP port number.

TCP port numbers can be assigned to specific applications and, therefore, can be used to block access to those applications, said Homer Jamison, NAT's vice-president of marketing.

With the transparent bridging function, the device is now able to pass non-TCP/IP packets to a central site, thereby enabling it to handle other transport protocols such as Novell, Inc.'s Internetwork Packet Exchange (IPX) and Digital Equipment Corp.'s DECnet.

LANB/280

NAT's LANB/280 is a two-port TCP/IP bridge/router that supports Ethernet local-area networks and synchronous links operating at speeds up to 2.048M bit/sec.

The LANB/280 uses the Point-to-Point Protocol (PPP) over the serial link and can interoperate with other IP networking devices that support PPP.

The bridge/router supports the Routing Information Protocol and can be managed by NAT's NMS/100 network management system or any other Simple Net-

(continued on page 20)

6 Ethernet-to-6 Ethernet via FDDI

Company Product	Forwarding rate	Bridge 1-way	Bridge 2-way	IP 1-way	IP 2-way
Cisco Systems, Inc.	Packet/sec	21,963	30,712	47,356	52,496
AGS+ bridge/router	Megabit/sec	58.6	58.9	58.6	58.9
Synernetics, Inc.	Packet/sec	84,816	82,138		
LANplex 5012 hub with bridging module	Megabit/sec	59.2	59.2		
3Com Corp.	Packet/sec			40,176	48,747
NetBuilder II bridge/router	Megabit/sec			59.2	59.2

SOURCE: HARVARD UNIVERSITY, CAMBRIDGE, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

Bridge/router tests yield mixed results

Big names shine in some Harvard performance tests; lesser known players take prize in others.

By Maureen Molloy
Senior Writer

WASHINGTON, D.C. — The biggest names in the bridge/router business do not always produce the best performing products, according to tests conducted at Harvard University's Office of Information Technology in Cambridge, Mass.

Vendors including Coral Network Corp. and Sigma Network Systems, Inc. came out ahead of more established players in certain tests, the results of which were unveiled here at INTEROP 92. For example, Coral shined when bridging between Fiber Distributed Data Interface local-area networks, while Sigma topped the field in routing between Ethernets via FDDI.

But perennial stalwarts such as Cisco Systems, Inc., Proteon, Inc. and 3Com Corp. also had their moments during six tests performed to measure packet loss rate under various internetwork configurations, including links between similar types of LANs and wide-area tests (see graphics, this page and page 42).

The tests were conducted by Harvard consultant Scott Bradner, who also chairs the Internet Engineering Task Force's Benchmarking Methodology Working Group. The tests are intended to give users an impartial source of information on the performance of bridges and routers.

One test, in which Transmission Control Protocol/Internet Protocol data was routed between Ethernet LANs via an FDDI backbone, showed that nearly all bridges and routers could forward packets at the full Ethernet

wire speed of 14,800 packet/sec.

When routing data simultaneously among four Ethernets via an FDDI backbone, Sigma's Enterprise Communication Server (ECS)/1 outperformed better known rivals such as Cisco and 3Com by forwarding data packets at a rate of 59,270 packet/sec. The maximum speed of the tester was 59,520 packet/sec.

Coral and Sigma came out ahead of more established players in certain tests.



In a test of TCP/IP routing between two FDDI LANs, a number of products were able to route data at speeds greater than 90M bit/sec, or close to the theoretical FDDI maximum of 100M bit/sec. They included 3Com's NetBuilder II and Cisco's AGS+.

Start-up surprises

When bridging between FDDI LANs, start-up Coral surprised some established players when its CX1600 bridge/router forwarded data at 140,780 packet/sec, or at 99M bit/sec. Packets per second were translated into bits per second by using various fixed packet sizes.

In tests performed between token-ring LANs over wide-area network links, the results showed

(continued on page 42)

Vitalink increases protocol support

continued from page 19

nets; the 6614, one FDDI and four Ethernet; the 6617, one FDDI, two Ethernet and two T-1 lines; and the 6619, one FDDI and four T-1 lines. The FDDI models are scheduled for availability in the third quarter and will be priced starting at \$24,000.

Vitalink also introduced 12-slot versions of its 6400 and 6800 bridge/routers.

The 6400 is currently a six-slot device with a 400M bit/sec backplane that can

support a maximum of four Ethernets or one FDDI ring. The new 12-slot model, which has the same bus capacity, can support a wider range of configurations, including up to 20 Ethernet LANs or one FDDI ring and 12 Ethernet connections. Token-ring support will be added at a later date. The new 12-slot version will be available in the third quarter, and pricing starts at \$19,500.

The 6800 currently features a 16-slot chassis, an 800M bit/sec backplane and support for as many as four FDDI rings. The new 12-slot version can support a

maximum of four FDDI rings and four T-1 lines, or four FDDI and four Ethernets. It will be available in the third quarter, and pricing will begin at \$23,500.

The new security software upgrades for all models in the 6000 line include the Network Control Facilities software package, which is divided into two modules that are available now free of charge.

The first software module, the Packet Control Facility, allows managers to set filters on a local or enterprisewide basis. The filters can prevent a set of devices or a single device from sending traffic across a

link, thereby protecting the host from transmissions from a variety of sources.

The other module is the Bridge Control Facility, which allows a net to be logically divided into closed user groups and gives an administrator the ability to determine which groups will be allowed to communicate with each other.

Vitalink also added support to the 6600 for the Department of Defense's Transient Electromagnetic Pulse Emanations Standard (TEMPEST), which is not yet available on the 6400 and 6800. TEMPEST-compliant devices are used in secure or classified federal government and defense networks to prevent electronic signals from being monitored.

Department of Defense Intelligence Information System Network Security Information Exchange (DNSIX)-compliant versions of the 6400 and 6800 will also be added via Version 2.1 of the DNSIX software. The security software provides access control, audit trails and network accounting.

TEMPEST versions of the 6600 are available now, and pricing varies, depending on number of units needed. DNSIX upgrades for the 6400 and 6800 will be available in the fourth quarter and are free of charge. **■**

NAT builds bridging, security into router

continued from page 19

work Management Protocol-based network management system.

The LANB/280 costs \$2,995. The security and bridging features are available now as a free software upgrade.

Graphical user interface

The vendor additionally announced last week that it will support a graphical user interface to its SNMP-based EtherMeter from DEC's DEC Management Control Center Management Station for Ultrix (MSU).

This support will aid MSU users in managing their nets by giving them real-time graphical displays of network performance and operational statistics reported by EtherMeters.

An EtherMeter is a LAN segment monitoring device that tracks traffic in a single Ethernet segment. EtherMeters help network administrators visualize the overall health and performance of a network by graphically displaying network traffic and loads as well as highlighting errors in real time.

The data gathered by the EtherMeter can be used to diagnose network problems, determine net performance and manage network traffic.

For instance, if a problem with a particular segment is suspected, a network administrator can use the MSU to poll the EtherMeter attached to the segment. If the network is down, a network manager can use the MSU to place a modem call directly to the EtherMeter in order to diagnose the problem.

The EtherMeter can also be programmed to initiate a modem call to a centrally located net management station when an alarm condition occurs.

The new EtherMeter costs \$1,795 and is available now. **■**

Interphase provides more high performance FDDI solutions for open systems than any other vendor worldwide.

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Circle Reader Service #115

Link Notes

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For more information, contact SMC at (800) 762-4968.

Datability, Inc. has rolled out a new server that combines the operation of a multiplexer and dial-up Internet Protocol and Local Area Transport (LAT) router in order to connect systems in remote locations to each other via a standard switched telephone network.

The new Mux/Routers support use of

dedicated circuits as well as "access on demand" connections via dial-up modems and data service unit/channel service units.

As a LAT router, Mux/Routers provide LAT over IP routing to Digital Equipment Corp. hosts. When corporate computing resources are dispersed, remote access to one local-area network via a Mux/Router allows access to all locations on the corporate net.

The servers are expected to be available in August, and their pricing starts at \$2,999.

Datability also released a new gateway that connects LAN- and wide-area network-based users to Systems Network Architecture nets.

The 3270 Cluster Controller Line Card fits into Datability's VCP 1000 Communications Server and provides SNA connectivity for all LAN-based Transmission Control Protocol/IP users as well as DEC LAT users.

The gateway will be available in July and is priced at \$5,999.

Datability can be reached at (201) 438-2400.

Clearpoint Research Corp. has announced that its Constellation Series of internetworking products has successfully passed interoperability tests with WilTel's WilPak frame relay service.

Clearpoint's 10-port Little Dipper and five-port Pyxis stand-alone bridge/routers as well as its five-port Industry Standard Architecture (ISA)- and Extended ISA-based Auriga boards for file server and workstation applications were all deemed compatible with WilPak.

For more information, call Clearpoint at (800) 253-2778. ■

Sprint Int'l releases frame relay switches

continued from page 13

work side and a variety of user-side interfaces, including V.35 and X.21, among others.

Among the TP4900 F-Series features are use of Discard Eligible bit, which lets users designate specific traffic as being expendable during congestion.

The switches also support accounting capabilities that let users or carriers keep track of frames sent and received so customers can charge back departments and carriers can offer usage-based as well as flat-rate service pricing.

Sprint International's switches handle traffic exceeding the minimum guaranteed amount, or committed information rate, by using a method called Burst Bandwidth Trunking, which allocates channels on the trunks to handle any extra traffic, Taffel said.

The switches, which are available immediately, range in price from \$15,000 to \$51,000, while the individual line cards cost from \$8,800 to \$9,900. Comparatively, the base StrataCom switch costs about \$20,000 and its line cards cost about \$14,000 each, according to Sprint International.

A TP4900 F-Series configured with five ports will cost about \$64,500, while one with 12 ports will cost about \$138,600. Users can implement redundancy by installing an extra card to back up all other line cards in a switch.

Handling frame relay

Berge Ayyazian, a vice-president at The Yankee Group, a market research firm in Boston, said the Sprint International switch is significant in that "it allows users and carriers to build packet-based, rather than mux-based, frame relay networks — that is, networks optimized to handle frame relay data."

While Sprint International's TP4900 F-Series switches are optimized more for frame relay nets than StrataCom switches are, those from StrataCom offer other benefits, including the ability to handle voice and the promise of T-3 capacity, he said. Sprint International's more focused pursuit of the frame relay equipment market could turn out to be good news for users in that it could create price competition, Ayyazian added.

"The Sprint [International] switch will increase competition in the frame relay equipment market, and that could put downward pressure on prices," he said. "StrataCom hasn't had any pressure up until now." ■

Focus On Token Ring

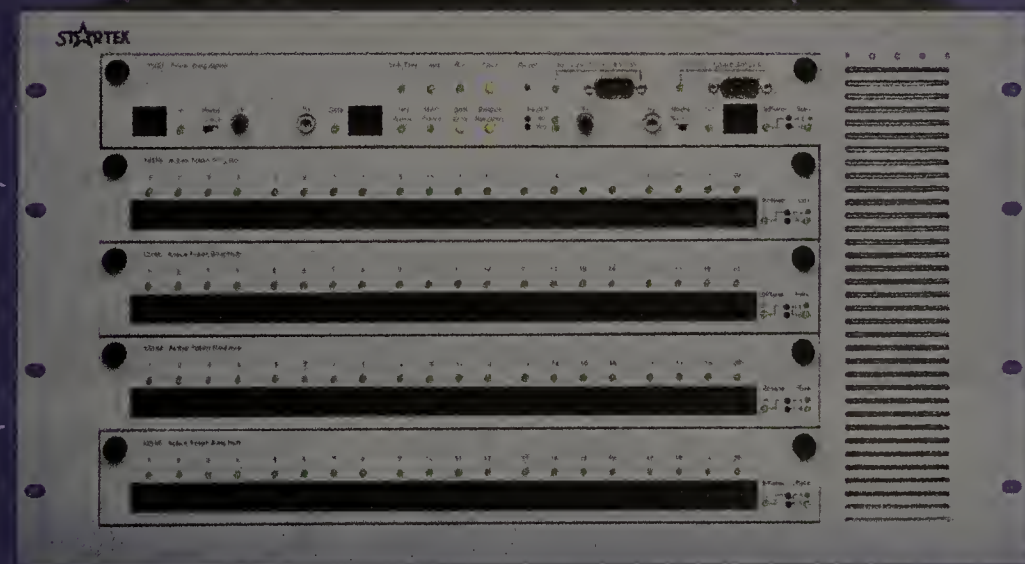
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2 Slot Chassis

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5 Slot Chassis

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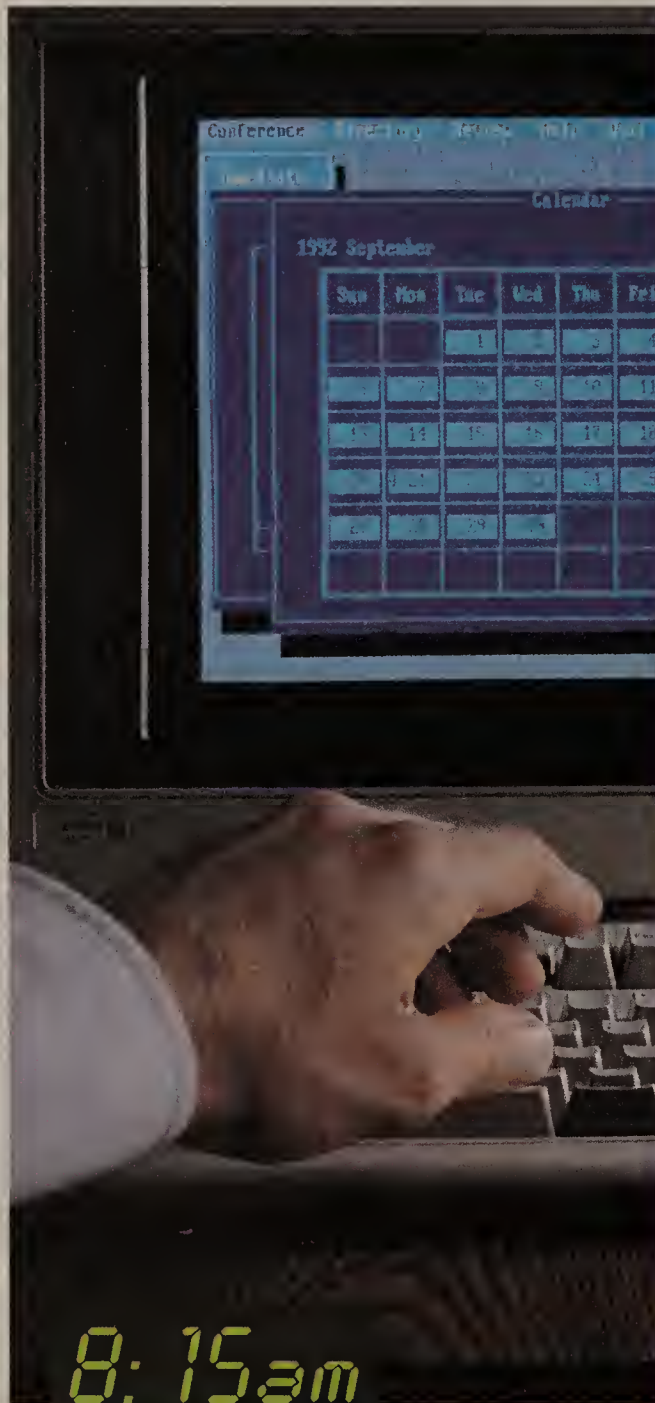
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Worth Noting

The U.S. market for voice mail services from local exchange carriers, long-haul carriers and service bureaus will soar from \$600 million in 1991 to \$4.5 billion by 1996, according to Frost & Sullivan, Inc., a New York research company.

Regulatory Update

AT&T this week is adding a new provision to the general provisions covering all of its Tariff 12 deals that requires advance payment or a deposit from new customers that have a history of late payments, unknown financial status or have shown they will probably not generate enough traffic to meet minimum annual commitments.

The advance payment will not exceed one month of basic charges under the Tariff 12 deal and one month's estimated switched voice charges. The advance payment will be credited to the customer's initial bill.

The deposit may not exceed two months of basic charges and two months of estimated switched voice charges. It will be held by AT&T as security against future unpaid bills.

AT&T will pay 3% simple interest annually on the money held as a deposit. The deposit will be returned when the customer has established a prompt payment record with AT&T for one year. The carrier did not indicate what criteria it would use to determine a customer's creditworthiness.

RTT-Belgian Telecom USA later this year is slated to
(continued on page 27)

IBM VAN service gets new pricing and broader reach

Extends advanced network capabilities overseas.

By Michael Cooney
Senior Editor

WASHINGTON, D.C. — IBM last week polished up its value-added IBM Information Network (IIN) service by introducing fixed pricing schedules and international support for X.25 and Advanced Peer-to Peer Networking (APPN).

The new capabilities, available in September, will give users a better handle on network costs and extend advanced network capabilities overseas.

IIN has dial-up access in almost 300 cities in the U.S and 100 locations in Europe and Japan. It supports electronic mail, electronic data interchange, leased-line and a host of Systems Network Architecture-related network services.

The fixed-price feature is contained in the new Enterprise Networking Service (ENS). With ENS, monthly charges based on the speed and number of access ports used are fixed. For example, an ENS bridged connection running at 9.6K bit/sec now costs \$750 per month, whereas the

cost previously varied, often reaching hundreds of dollars more per month.

ENS covers IIN's leased-line SNA connections, SNA Interconnect, SNA 3270, SNA Remote Job Entry, APPN and X.25 services.

"Previously, we had a fixed-price option, but it required the user to have 20 or more connec-

"Predictable fixed-price options let the user budget more effectively."

▲▲▲

tions, and it didn't include the number of services we now include," said Bruce Jackson, director of international product marketing for IIN. "Predictable fixed-price options let the user budget more effectively."

(continued on page 27)

ATC announces Customer Defined Network service

By Anita Taff
Washington Bureau Chief

ATLANTA — Regional long-distance carrier Advanced Telecommunications Corp. (ATC) announced at the recent International Communications Association annual conference here a virtual network service targeted at midsize to large customers.

ATC will become the fifth domestic long-distance carrier to offer a virtual net service when it deploys its Customer Defined Network offering this fall. The service will support inbound and outbound voice and switched 56K bit/sec data transmission and may ultimately be packaged with ATC's existing private-line services.

The carrier, based here, is targeting its Customer Defined Network service at users spending \$10,000 per month or more, according to Mark Welton, director

of marketing. The floor for rival offerings from AT&T, MCI Communications Corp. and Sprint Corp. is around \$25,000.

Although ATC is targeting smaller customers, it is not scrimping on features, according to one analyst who was briefed on the product last week.

"ATC has rolled out a good, full-fledged offering for the mid-range customer," said Daniel Briere, president of TeleChoice, Inc., a consulting firm in Montclair, N.J.

ATC will initially offer its virtual network with eight features: customer-defined dialing plans; on-net, off-net and calling card call origination; verified and non-verified account codes; speed dialing; dedicated termination overflow; class of service and range privileges; custom billing options; and security features.
(continued on page 27)

"What users have to do is compare the cost of frame relay and SMDS to the cost of linking different sites via high-speed private lines."

Frank Gratzner
Executive director for
broadband data services
Bell Communications Research



Bellcore official airs view on new services

Frank Gratzner, broadband data services exec, talks about evolution of frame relay and SMDS services.

Q&A Coordinating the work needed to help the seven regional Bell holding companies make frame relay and Switched Multimegabit Data Services (SMDS) a success is no easy job. But it's one that Frank Gratzner, executive director for broadband data services for Bell Communications Research, has taken a liking to.

His staff is working with the RBHCs to develop a common set of technical documents designed to speed the development and continual enhancement of new services, including frame relay and SMDS.

The RBHCs — and two independent local exchange carriers — pledged support for both services at an unprecedented joint press event that was simulcast between INTEROP 92 Spring in Washington, D.C. and the International Communications Association's 45th Annual Conference and Exposition in Atlanta ("Nine carriers jointly unveil SMDS, frame relay plans," *NW*, May 25).

Gratzner discussed that announcement and the future of frame relay and SMDS — as offered by the RBHCs — with *Network World* Senior Editor Bob Wallace.

What's your appraisal of the local telephone companies' frame relay and SMDS plans?

The power of the announcement was that it showed a very balanced approach to meeting customer needs. The regions are

starting to talk about two services, frame relay and SMDS, that they plan to roll out.

It's also important that the local carriers have really come through with some specific data.

Even though this announcement talked about deployment up to the end of 1993, I expect there will be a lot of additional cities. Some regions will come out three to six months from now and give more cities. A case in point is BellSouth [Corp.], which has announced service to four cities but, if things go well, will announce close to 30 more cities.

What's the next step for the telephone companies?

After offering the local service, the next step is to bring some of the negotiations with interexchange carriers to fruition. We'd like to be able to say that frame relay and SMDS are nationwide services. The telcos will also be announcing additional features in areas like network management. There will be a lot of activity there.

What do you make of the SMDS pricing that is out there now? Is it high, low or just right?

What users have to do is compare the cost of frame relay and SMDS to the cost of linking different sites via high-speed private lines. For example, if I've got four locations, what is the cost of connecting those with half a dozen DS1s vs. using SMDS. There are considerable savings in using
(continued on page 37)



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IBM VAN service gets new pricing

continued from page 25

According to a recent International Data Corp. study of the worldwide VAN market, users have been leery of VAN services, such as IIN, because of their confusing price structures. The Framingham, Mass.-based market researcher said fixed costs, especially in the international arena, would be attractive to users. But ENS is only available for U.S. customers.

IBM did, however, broaden its interna-

tional IIN data services by adding APPN and X.25 options so users could grow peer-to-peer nets internationally, Jackson said. IBM already offers X.25 and APPN support domestically.

"These enhancements provide alternatives to those users who want to build international APPN or X.25 networks but don't have the money to build the network themselves," he said.

Users can now use IIN to build APPN or X.25 networks internationally without having to deal with the disparity and complexity of the international telecommuni-

cations marketplace, according to Jackson.

"The X.25 support is important to the smaller trading companies, especially in Europe," said Victor Wheatman, an analyst with Gartner Group, Inc. in Santa Clara, Calif.

In addition to the new services and support, IBM said it will begin testing this summer its recently announced router, the 6611 Network Processor, for use in IIN.

When IBM announced the 6611, the company said it would include support for the router on IIN. To prepare for that, IIN

is currently operating an internal pilot network among six locations using a variety of protocols and equipment, according to IBM.

Another field trial, scheduled to begin this summer, involves a new IIN service feature called CelluPlan II, which would enable customers to access the IIN using cellular links. Jackson said the new service would transmit data at speeds up to 19.2K bit/sec.

IBM did not say when either of these trials would bear actual implementation fruit. **Z**

ATC announces network service

continued from page 25

such as authorization codes.

Briere said that these features are comparable to those offered by rivals and should be plenty to satisfy most medium to large users. "Ninety percent of virtual network customers use only a small group of features, so this puts ATC in a very competitive position," he said.

In addition to the initial eight features, Welton said more generic features as well as customized features for specific users will be added.

According to Welton, the intelligence of ATC's network switches and the use of Signaling System 7 will enable the carrier to roll out new customized features. ATC's network is all digital and based on 14 switches from DSC Communications Corp.

The Customer Defined Network will be available nationwide. However, because ATC serves only 25 states, users outside those areas will have to be tied into ATC's net via private lines from other carriers.

Briere pointed out that this private-line backhauling, as it is called, could get expensive for customers with many dispersed sites. He said he believes ATC will derive most of its virtual net business from its customer base.

ATC declined to release prices for the service but Welton said rates will be priced by zone and there will be peak and off-peak rates. He said there will be a small surcharge for data above the voice prices on the network. **Z**

Regulatory Update

continued from page 25

roll out an international switched data service to seven countries. The new service, dubbed Megaline, will allow users to make data calls at speeds from 64K to 1.92M bit/sec via a 2M bit/sec access line.

Megaline will initially be available to Denmark, Finland, the Netherlands, Norway, Sweden, Switzerland and the U.K. (with Mercury Communications, Ltd.).

The Pennsylvania Public Utility Commission recently announced it is seeking public input for a study it will do on the Commonwealth of Pennsylvania's telecommunications infrastructure.

The study is designed to analyze current and emerging technologies and will determine the cost and benefit of each. Parties interested in providing comments or input should call Deloitte & Touche Team at (800) 877-9623. **Z**

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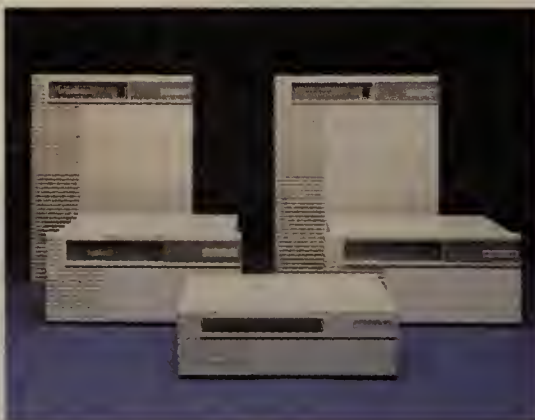
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Worth Noting

“Corporations want programmers focused on building distributed applications. But most programmers are mired in communications issues, spending months on network protocols before being able to ask what the application will even look like.”

Hub Vandervoort
President
Horizon Strategies, Inc.
Needham, Mass.

Store & Forward

Lotus Development Corp. last week announced cc:Mail MS-DOS Platform Pack Version 4.0. The new software includes terminate-and-stay-resident (TSR) support that brings the overhead of electronic mail down to 1.5K of memory with Expanded Memory Specification support and enables users to “hot-key” between applications.

Additionally, the package offers a built-in spell checker utilizing a 190,000-word dictionary. Other features include draft and trash folders, application launching and full-text search by key word.

New administrative features include a release of the product’s ADMIN utility, improved reporting capabilities and support for up to 493,000 entries, compared to 64,000 in the cc:Mail directory.

cc:Mail MS-DOS Platform Pack Version 4.0 costs \$295 and is available now. An upgrade costs \$95 from Version 3.2/3.21 and \$125 from Version 3.15 and earlier. ■

Syscorp adds new tools for client/server development

MicroStep shortens application development time.

By **Wayne Eckerson**
Senior Editor

AUSTIN, Texas — Syscorp International last week unveiled two new versions of its development tool for building client/server and transaction-processing applications.

Syscorp’s MicroStep product lets developers build applications for use on stand-alone personal computers or Novell, Inc. NetWare- and Network Basic I/O System-compatible local-area networks without having to write code. The multiuser applications can access Novell’s Btrieve and NetWare SQL databases, Ashton-Tate Corp.’s dBASE as well as ASCII databases.

Syscorp dubbed MicroStep a visual programming tool because it incorporates computer-aided software engineering (CASE) logic that lets programmers design an application in graphical form. Programmers use a mouse to literally draw a two-dimensional design of their application that shows how all the elements within an application interact to execute tasks.

Programmers also use a mouse and processing functions defined in pull-down menu options to design screen layouts and reports and build special features into programs.

Additional functions

The new versions of the product — MicroStep 1.6 and MicroStep QS — add functions that developers can incorporate into applications, such as pop-up selector lists and hot keys that let end users toggle between application modules. The products also support a new active data dictionary that notifies users of all elements within an application that will be affected by a proposed change and will make the changes if required.

Version 1.6 makes use of extended memory, allowing programmers to develop large applications.

MicroStep QS cannot be used with extended memory and is priced as a low-end development tool for building small and mid-size applications. Both products require only 512K bytes of memory and run on DOS 3.3 or higher.

“MicroStep is an interesting,

overlooked product,” said Stuart Woodring, director of software strategy research at Forrester Research, Inc. in Cambridge, Mass. “It provides an easy way for companies with big investments in NetWare to build some useful work group applications cheaply and with minimal programming resources.

Look of the future

“MicroStep represents the direction application development is headed,” Woodring said. “It will be important for companies that want to do rapid prototyping and shorten application development cycles.”

The product’s visual programming capability makes it easier and quicker to develop applications, according to Tony Capraro, vice-president of marketing at Syscorp.

For example, programmers using MicroStep can build certain functions, such as pop-up selector lists, into an application in seconds. The same procedure might take 45 minutes using a competing PC application development tool that requires developers to program in a C-like code, he said.

Overall, based on internal benchmarks and customer trials, MicroStep lets developers build applications four to five times faster than other PC programming tools, Capraro claimed.

MicroStep also has a Bug Zapper function that checks application designs for errors and tells programmers how to fix them. Catching problems early saves companies time and money in development costs, Capraro said.

Woodring said MicroStep will take off in the marketplace once the product enables developers to build Microsoft Corp. Windows applications. MicroStep applications now run in DOS.

Capraro said Syscorp plans to add support for Windows and Oracle Corp.’s Oracle SQL database within the next year.

MicroStep QS is priced at \$895 and will be available at the end of this month. Version 1.6 is priced at \$1,895 and is available now.

Syscorp does not charge a royalty or run fee to value-added resellers that sell applications built using MicroStep. ■

“We have an integrating technology that allows this heterogeneous world to be coordinated. We have an answer to a vexing problem, which is interoperability. I don’t think our friends at Borland [International, Inc.] or Microsoft do.”

John Landry
Senior vice-president and
chief technology officer
Lotus Development Corp.



Lotus exec outlines net application plans

Chief Technology Officer Landry discusses vision of network computing, competitive challenges.

Q&A Lotus Development Corp. Chief Executive Officer Jim Manzi says he has bet the company’s future on network applications, but it is John Landry who will have to play Lotus’ technology hand. Landry, senior vice-president and chief technology officer for the Cambridge, Mass.-based company, joined Lotus late last year from Dun & Bradstreet Software, where he was executive vice-president and chief technology officer.

Landry has an extensive background in the software industry, having started his own company, Agility Systems, Inc., and serving in senior management positions with Cullinet Software, Inc., Distribution Management Systems and McCormack & Dodge Corp.

He spoke recently with *Network World* Editor John Gallant and Management Strategies Editor Wayne Eckerson about the network application market and the challenges facing Lotus.

Why did you move to Lotus?

There used to be two camps in this business: the personal computing camp and the enterprise, or group computing, camp. And there was very little cross-pollination. But you started seeing a blending of the best of personal computing — task switching, imaging technologies, rich font technologies — with the best of enterprise computing — multitasking, rich operating systems, shared information. The whole paradigm changed through cli-

ent/server computing, and Lotus has the largest installed base of true client/server systems in the world with Notes.

The game has changed. There is no longer this tremendous gulf between the two camps. They are starting to be a somewhat homogeneous group of vendors. What it comes down to is that the guys with the most experience in graphical applications and personal computing [are on the right track] vs. the guys who are trying to move a customer base from the mainframe world.

Network computing is where it’s at — this notion of a communications-centric architecture vs. database-centric. This company has a better idea of what that is all about.

Why is Lotus better positioned to handle this emerging market than a Microsoft Corp. or a Borland International, Inc.?

Largely because we have this incredible backbone of cc:Mail and Notes that we can build things on that the other guys don’t have. Borland doesn’t have a mail system right now, and they certainly don’t have anything that resembles Notes. They’re not communications-centric; they’re database-centric.

We have the premier examples of communications software in a usable form. I’m talking about a layer on top of a network operating system that provides much more value. The other guys haven’t woken up to this yet.

(continued on page 30)

Lotus exec outlines net application plans

continued from page 29

We've got this incredible substrate facility in Notes that we can plug applications into. It's like a bus, and our apps are cards that sit on the bus. We are already network-enabling our apps. The new version of 1-2-3 that will come out later this year will be an example of group spreadsheets.

But Microsoft can say, "We're building those capabilities into the operating system; you won't have to buy this added layer of Notes."

That's great if it's Windows-to-Windows. As long as you're in a [William Gates] environment, that's great. But most companies are multienvironment, so there's a problem. We love a wonderful, heterogeneous operating system world. We integrate those operating systems. The more heterogeneous, the better it is for us.

Most people have a dated model of computing. It is based on the notion that we do computing for our company, here. You have to start thinking about the world of computing for virtual companies, where your suppliers, customers, partners and employees are tied together by communications technology.

Even if you accept the fact that an [information systems] director has been so persuasive that he's cleaned every [Apple Computer, Inc.] Macintosh, Unix and OS/2 box out and has bought Bill's line — hook, line and sinker — the minute he wants to coordinate with another company that just happens to have bet the farm on Unix, he ain't gonna be able to do it. Bill's stuff only works with Windows.

We don't have any operating system ax to grind, and they do. We have an integrating technology that allows this heterogeneous world to be coordinated. We have to provide applications that exploit this capability. I'd rather be in our position. We have an answer to a vexing problem, which is interoperability. I don't think our friends at Borland or Microsoft do.

You've talked about building applications on top of Notes. Doesn't that mean you not only have to sell the applications, but Notes, as well?

It's really a pricing and packaging issue rather than a selling of Notes. Notes has a layer of services that we call 'Noteware.' For the most part, Notes is the only app that uses the Noteware services; 1-2-3 will be the next app to use Noteware services.

Whether that is packaged as 1-2-3 for networks or 1-2-3 in Notes is largely a packaging issue, not a technology one. It's an issue of how it's bundled.

As my databases get more distributed and my PC operating system starts to provide more communications and data access capabilities, how long will I be willing to pay for this Notes substrate?

The models are very different. There is a connected model of database, and there is an occasionally connected or disconnected model of database. SQL databases are out of the model of mainframe databases, based on the notion of connectivity.

The connected model is a tired model. I am absolutely sold on the notion that what

you want is a disconnected model [based on] replication services. With replication, occasionally this guy dials this guy and they do an exchange. At that point, we have a synchronized database.

That is a far better model for everything that is going on in the world than trying to get a coordinated commit across 13 countries in order to execute a particular database update. The notion of distributed database is one of coordinated commits. For transactional apps, that might be OK. With information apps, which are what Notes is all about, the replicated model is

much better. That is not available in any database management system today.

We've got this other huge occurrence — wireless communications, portables, laptops, palmtops, pen-based systems. They are about mobility, nomadic computing. Remotes imply they are tied to something occasionally, not all the time. People often think about remote computing as time-sharing. Replicated database technology, using the communications substrate underneath, is better. That's why we talk about Notes and Noteware a lot. It makes this world of portables and laptops

fit in. It's a better way to handle the problem than traditional databases.

How long are you going to be the only company with that capability?

Part of our focus is to keep making this as broad as possible. By definition, it is insufficient to coordinate one part of the organization — for example, the part that is Windows. Broadening Notes to multiplatform, that is a big stopper. That costs a lot of money. The replicated technology has been in Notes from the beginning, and Notes was built starting in 1986. As yet,

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You've talked about broadening Notes from a workstation perspective. What about a server perspective? Does it make any sense to get it on a mainframe or a minicomputer?

That's a very emotionally charged issue. For the most part, mainframe and minicomputer operating systems aren't [designed for servers]. We'll invest in the new technologies rather than the old.

Mainframe systems, which hold this vast quantity of legacy data, are valuable from the perspective that we can grab onto that data and pump some back in. But we can't be everywhere at the same time. Mainframes and minis are in decline. Unix, OS/2 and Windows servers are on the rise.

How many of your customers are even scratching the surface of Notes' capabilities, rather than just using Notes as a message system?

They're getting there. Part of that is dependent on us or potentially caused by us.

But you're right, and to that end, we've just introduced the 'fab-free 50,' which is 50 free apps [for Notes customers.] We have absorbed the best apps that our customers have created — customer tracking, lead systems, etc. — and they are available for free, a starter kit to get your mind going.

But those are traditional applications. The promise is that Notes can change the way you work, but how do you get people to do that?

Missionary work. That's really my job. There have been hardware and communi-

cations changes that enable you to do things you never thought about doing before. We want to tell you what we think those things are — video Notes, extended enterprise computing, the virtual company notion.

For argument's sake, you're selling Notes to the cream of IS users, which are prepared to make fundamental changes in the way they work. As the base expands, there is a potential for a backlash among customers not ready for those changes who find they aren't getting what they hoped for out of an expensive product.

You're talking to the wrong guy. Notes has the happiest user base of any product on the market today. The problem is getting more people to know that, but it is in a snowballing state right now. The user groups are forming, and we're starting to get a sharing of ideas and apps. We're doing a lot to make it ubiquitous. When people use it, they become trapped by it.

To some extent, Lotus is becoming a database company. You tell people you've got a new generation of applications and Notes is the best place to manage the data.

We are agnostic on operating systems and database management systems. But for the type of data we have, that [statement] is absolutely correct because there isn't anything else. With the object databases, which would come closest to fulfilling that need, you can count the users on your hand and the products have abysmal security and no replication facilities.

Would you share replication technology to make it easier for users to work with existing databases?

We're not going to give replication away. That's sacred. In Version 3, we have full SQL transparency at the document level, meaning you can have hot documents in Notes. The document contains a query, and you see the result of the query the last time it was executed. You're not dealing with the database directly; you're dealing with it indirectly through Notes. We think for most people's needs, this is adequate.

Why are there only a handful of applications really designed to take advantage of networks today?

The networks themselves were fairly weak. Network computing, in terms of LANs, meant shared hardware file systems. People didn't change the architecture of their apps because they weren't using any sophisticated database technology on the back end. It was single-user thinking. It wasn't until the database vendors started moving forward with richer SQL databases on LANs that the notion of client/server [took off]. It also took awhile to change people's thinking.

We're just on the crest of it now. LANs are getting more robust. The database systems are there. There are systems like Notes now to do things you never could do on a mainframe. The wave of graphical user interfaces has made it even more compelling to do data processing on this type of platform.

The planets are really lined up now for the growth that everybody anticipated. ■

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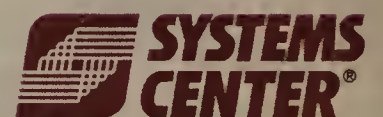
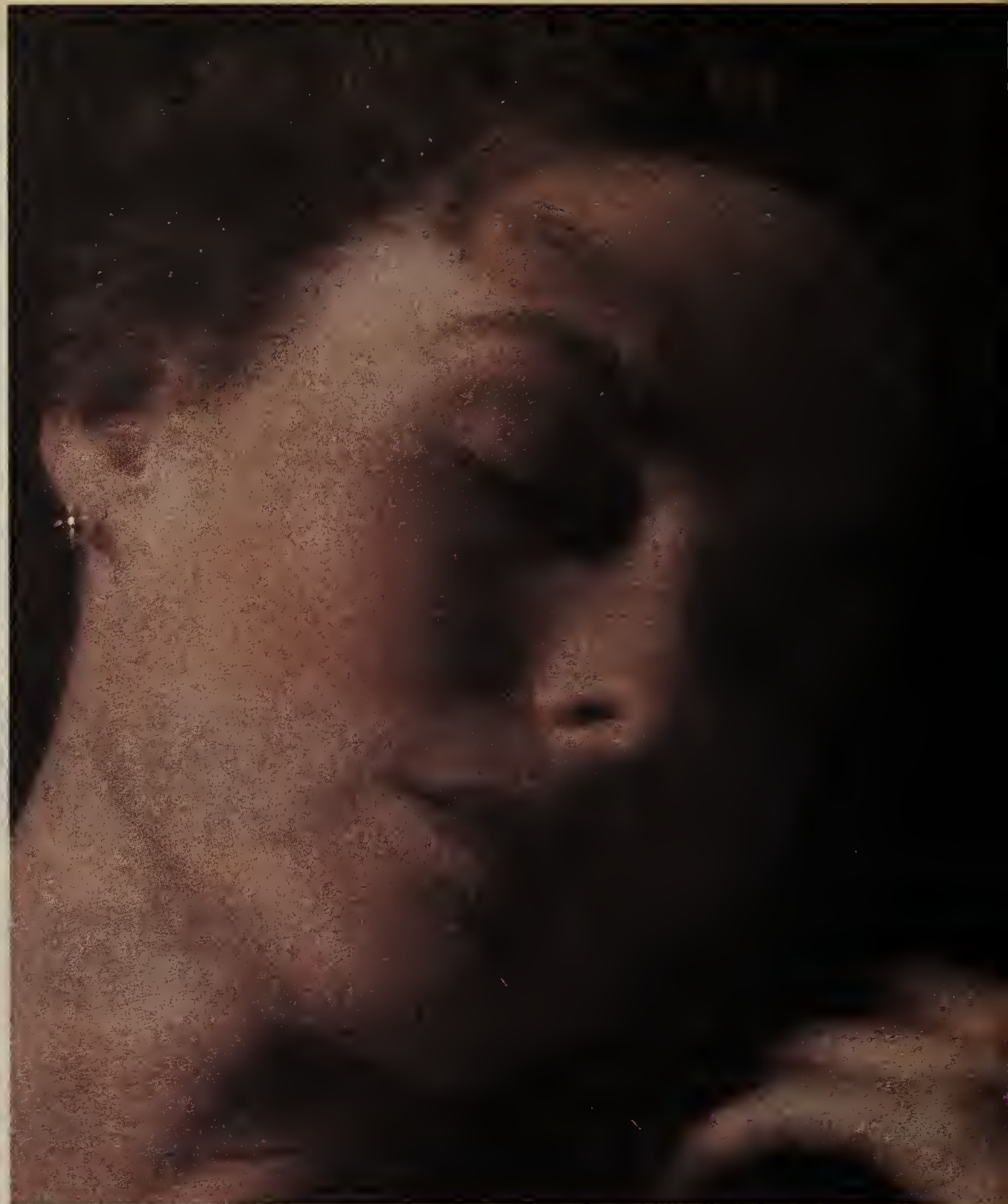
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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

Worth Noting

“We’re set to offer [switched virtual circuits] on our frame relay network. The question is when the CPE vendors will be able to place calls over the [switched virtual circuits].”

Gary Stoy
Product manager
BT North America, Inc.
San Jose, Calif.

People & Positions

CrossComm Corp., a Marlborough, Mass., maker of token-ring routers, last week named **Nick Grewal** vice-president of operations.

In his new position, Grewal will be responsible for the direction of the firm’s engineering, manufacturing and networking services.

Grewal replaces **Vic Sabella**, who recently left CrossComm.

Previously, Grewal was vice-president of engineering at Proteon, Inc.

Kalpana, Inc., a Santa Clara, Calif., maker of Ethernet switches, has named two new members to its senior management team.

Stanley Davis, who was named vice-president of sales, will be responsible for the sales and technical support of Kalpana’s EtherSwitch products.

Previously, Davis held the position of vice-president of North American sales at Paralan Computer, Inc., a super-server vendor.

Richard Rathmann was named vice-president of operations. Previously, he was vice-president of manufacturing operations at modem maker Telebit Corp. ■

Service woes continue to plague AT&T ISN users

NCR acquisition only adds to existing problem.

By **Jim Duffy**
Senior Editor

LA JOLLA, Calif. — Service and reliability problems continue to plague users of AT&T’s Information Systems Network (ISN), forcing some to seek alternatives from other vendors.

At a Network Users Group — AT&T (NUGATT) meeting here recently, users of ISN switches said NCR Corp. representatives — who took over service and support for the ISN when AT&T purchased the company last summer — are unfamiliar with the product, deliver the wrong parts and conclude service and repair work before the job is finished.

“The merger [between AT&T and NCR] is going a little rougher than people expected,” said Stephen Patrick, director of computing services at Bradley University in Peoria, Ill., and NUGATT president.

But the NCR acquisition has only exacerbated an ongoing

problem. Dissatisfaction with support of data communications equipment has been a recurring theme at NUGATT meetings for at least three years. Each time, AT&T has sought to reconcile the problems, only to fall short.

Concerned users

When AT&T acquired NCR last summer, NCR assumed sales and support of the former AT&T Computer Systems’ product line. Since then, the quality of service has worsened, users contend.

Last week, AT&T attempted once again to assuage disgruntled users by disclosing that it will hand over service responsibility for ISN, the Datakit II Virtual Circuit Switch, Broadband Networking System (BNS)-1000 and other data communications gear to AT&T Network Systems by the end of the year.

“We believe that this transition will be very helpful,” said Jo-

(continued on page 36)

“We realized Trakker involved a very powerful technology and it would be difficult for a company of our size to support both Trakker and MAP [products].”

Tony Helies
President and
Chief executive officer
Concord Communications, Inc.



Concord maps out new product focus

Market acceptance of Trakker leads firm to play down MAP line, set sights on analyzer market.

By **Bob Brown**
Senior Editor

MARLBOROUGH, Mass. — Concord Communications, Inc., a longtime proponent of the Manufacturing Automation Protocol, has officially curtailed development of MAP gear to focus on the network monitor and analyzer market.

Concord’s decision to de-emphasize its MAP product line, which includes controllers, modems and software, was the result of various factors, including the decline of the automotive industry, the largest consumer group of MAP products.

But the foremost reason for Concord’s strategic shift has been market acceptance of the company’s Trakker network monitor offering, which was unveiled about a year ago.

Trakker monitors traffic on Ethernets in real time, enabling users to track which devices are communicating to whom and which applications are being used. The product is based on technology developed by Concord while it was working on its IEEE 802.4 MAP products.

“When our customers saw the technology, they said, ‘This is OK for MAP, but it would be fantastic for Ethernet,’” said Tony Helies, Concord’s president and chief executive officer. “We realized Trakker involved a very powerful technology and it would be difficult for a company of our size to support both Trakker and MAP [products].”

Concord, which was formed in 1986 to build products for the

factory automation market, has now shifted the bulk of its development money and efforts to Trakker.

Future plans include adding support for token ring and porting the product to other platforms, Helies said. Trakker is based on the SunConnect SunNet Manager and will be offered on

The firm has increased its user base a hundredfold since introducing Trakker.



Hewlett-Packard Co.’s OpenView net management system.

While Concord is privately held and does not disclose sales figures, Helies said the firm has increased its user base a hundredfold since introducing Trakker, including many users who had never heard of Concord before. The company expects Trakker revenue to exceed MAP product revenue by year end.

Trakker competes with net monitoring products, such as Network General Corp.’s Distributed Sniffer and Novell, Inc.’s LANtern. It does not, however, compete against more traditional net protocol analyzers such as Network General’s original Sniffer.

While Trakker is an easy-to-

(continued on page 36)

INDUSTRY BRIEFS

Starlight attracts investors. Starlight Networks, Inc. of Mountain View, Calif., which is developing desktop computer products to support network multimedia and video applications, last week announced it has received \$2.5 million in financing from several investors, including investment firms Merrill, Pickard, Anderson & Eyre, Accel Partners and Bass Associates.

D&B Software buys Powersoft technology. Dun & Bradstreet Software, Inc. of Framingham, Mass., last week announced it has acquired the rights to Powersoft Corp.’s client/server technology for an undisclosed amount. D&B Software uses Powersoft’s PowerBuilder tool set as its client/server development tool.

No middle ground. Artisoft, Inc. of Tucson, Ariz., and Performance Technology, Inc. of San Antonio, Texas, last week announced they have broken off negotiations that would have led to Artisoft’s acquisition of Performance Technology. Negotiations had been under way since April, but the companies were unable to arrive at a mutually acceptable purchase agreement.

Spider LAN line sold. Spider Systems, Ltd. of Edinburgh, Scotland, and Telecommunications Techniques Corp. (TTC) of Germantown, Md., announced the sale of Spider Systems’ local-area network monitoring and analysis product line to TTC. The Spider LAN products acquired by TTC will be marketed and sold under the TTC NetLens label. NetLens combines the former SpiderAnalyzer, SpiderProbe and SpiderSentinel products with TTC’s wide-area network protocol analysis products.

(continued on page 36)

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Service woes plague users

continued from page 33
seph Malik, team leader for Data Customer Services and Quality Management at AT&T Bell Laboratories. "The pool of expertise [AT&T Network Systems] is able to bring to bear complements very well the BNS-1000 and ISN users."

That complement comes too little, too late for some users. In the past year, AT&T has lost follow-on business with Minneapolis-based food giant General Mills, Inc., the New York State Power Authority (NYPA) and the University of Louisville in Kentucky.

According to Patrick, General Mills, which was looking to replace its ISN switches with AT&T StarWAN bridge/routers, has instead replaced AT&T as a supplier with Hewlett-Packard Co.

Glenn Cozine, senior communications specialist at General Mills and a former member of the NUGATT board of directors, declined to comment.

But General Mills reportedly received StarWAN bridge/routers as well as 10Base-T SmartHubs from AT&T that did not perform to the company's

satisfaction. AT&T replaced some of the SmartHubs, but the routers — and General Mills' future business — are HP's.

Utility looks elsewhere

NYPA still uses its ISN network to connect 50 asynchronous terminal users to Data General Corp. AViiON computers in Buchanan, Oswego and White Plains, N.Y., over 9.6K bit/sec links. But another 350 NYPA employees are using personal computers connected to 10Base-T Ethernet local-area networks to access the AViiON systems locally and 3Com Corp. bridge/routers to access remote LANs and AViiON systems.

With its 10Base-T-compliant Starlan adapters and SmartHub concentrators, along with StarWAN bridge/routers, which are manufactured by Cisco Systems, Inc., AT&T could have had that business. But inadequate service prompted NYPA to look elsewhere.

With the acquisition of NCR, NYPA's AT&T service representative was saying, "I don't know if I'll have a job tomorrow," according to Raymond Kappes, a networking official at NYPA.

"As a user, that just didn't sound good to me," Kappes said.

"I don't know who would service my account."

Scores of AT&T Computer Systems representatives did indeed lose their jobs after the NCR acquisition.

The University of Louisville was relying on AT&T to help migrate its ISN network to a router-based network and install more StarGroup servers in its LANs. StarGroup is AT&T's Unix-based LAN operating system.

But the school found it more efficient from a cost and support standpoint to deal with Cisco directly instead of through reseller AT&T, said Phil Duvall, director of repair and installation services for the University of Louisville's information technology operations and a former NUGATT board member. The school also opted for Novell, Inc.'s NetWare instead of StarGroup because of the service hiccups, he said.

"The effects of the changes going on [with the NCR acquisition] didn't help us," Duvall said. "The support we traditionally relied on so heavily was no longer there. We've got to move forward. There was an opportunity for them to move forward with us, but we couldn't adjust to their way of doing business and move forward at the same time." ■

Concord maps out new focus

continued from page 33

use and useful product, it has not sold as well as some observers had predicted, said Jill Huntington-Lee, a principal at Brandywine Network Associates, a Cinnaminson, N.J., consulting firm. Trakker's price, which starts at \$20,000 for one Ethernet segment and increases by \$6,000 for each additional segment, is putting off some potential customers and opening the door to other vendors with lower priced products.

According to industry watchers, Concord might be better off

looking for a strong partner or even a company to acquire it, which will enable Concord to price Trakker lower and get it better established in the market before competition heats up.

Concord is headed in the right direction with its focus on Trakker and away from MAP, said Huntington-Lee.

"MAP isn't really going anywhere," she said. "Trakker is exactly what [users] need."

The firm remains committed to supporting its installed base of MAP customers, Helies said. However, Concord would not rule out selling that installed base, including manufacturing rights, to another company. ■

Industry Briefs

continued from page 33

Partnership pays off. Octel Communications, Inc. last week announced that its development partnership with Manchester, N.H.-based System Development Co. (SDC) has resulted in the release of SDC's personal computer-based Voicemail Notification System. The product allows users with a single Octel voice processing system and multiple Rolm Co. switches at remote sites to be in-

formed that they have messages without dialing in to the voice processing system. The product, available through SDC, activates a message waiting light or a stutter dial tone for users whose Octel system is located off premises.

Net expansion continues. Ericsson Corp. last week signed a \$42 million contract to extend the cellular telephone net it began installing in 1988 in Guangdong, China. The new extension will add 55,000 subscribers. ■

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Bellcore official airs view

continued from page 25

SMDS. The same holds true for frame relay.

What are the trade-offs between the frame relay and SMDS pricing approaches?

All the SMDS pricing has been based on a flat rate. One reason for that is that it's easier to do. Customers that tend to have a lot of usage obviously like a flat-rate service. It tells them what they'll have to pay for unlimited usage.

There are customers that may just want to use [SMDS] more sporadically. They'll potentially be more interested in a usage-based service, which will be available later. Some [service providers] are talking about a combination of the two.

There's been a lot of talk about SMDS competing with frame relay. Is it a fair comparison?

There are many areas where the services don't compete. Frame relay is primarily being sold as a medium speed service, supporting 56K and 64K bit/sec up to 1.5M bytes. SMDS starts at 1.5M bytes and goes up to speeds

far above that. That's one important distinguishing feature.

For customers who just have intracompany enterprise networking needs, frame relay fits very well. You have to set up ahead of time all the locations that you want to talk to. That's not the case with SMDS. Anybody on the network can communicate.

Will SMDS still be considered the prime intercompany networking service once frame relay service providers begin to offer switched virtual circuits (SVC)?

You'll have to first look at the speeds at which they are offered. There's a huge market for lower speeds. There are an enormous number of private lines at 56K [bit/sec] and below. Some of the early versions of SVCs would stick to that lower speed and therefore not compete with SMDS.

What do the telephone companies need to do to make SMDS and frame relay successful?

Some of the things they have to do is provide customers with comprehensive network management, ensure that the service is

highly reliable and provide a high level of data service support. They must also make the service easy to order.

The telcos have to work with customers to help them understand how frame relay and SMDS fit into their network design. Users are not going to cut all their existing traffic over to a new service.

“For users who have intracompany enterprise networking needs, frame relay fits very well.”

▲▲▲

Experience with frame relay has shown — and I'm sure it'll be the same with SMDS — that there's a long sales cycle. It takes a year [to a] year and a half between the time users learn about something to the time they put it into their planning process.

One criticism of the telephone companies is that they don't understand how to

market data services. Critics have pointed to central office-based local-area networks and Integrated Services Digital Network. Is this a major obstacle they need to overcome in pitching frame relay and SMDS?

They have learned a lot from their experiences with those data services. It should help them be more successful with SMDS and frame relay.

The analogy I like to draw is with the U.S. auto market. The Japanese initially didn't make very good cars but they learned a lot and now their cars go like gangbusters. The telcos have to help users see the benefits of frame relay and SMDS.

There's a built-in market for these services. In the past eight years or so, customers have grown up. [They] have a lot of LANs at different sites within one or across several LATAs and already have high-speed applications. It's not like ISDN where the regions have had to go out and introduce users to a whole new kind of application that they've never even thought of before.

What role does the SMDS Interest Group play in the emergence of SMDS service?

The SMDS Interest Group, like the Frame Relay Forum, is an association of the telcos, interexchange carriers, equipment providers, etc. It provides a good forum for addressing issues.

The SMDS group has examined the interface between a router and a [data service unit/channel service unit] and have come to an agreement on what the specification for that should look like. You can take DSU/CSUs made by different companies and connect them to different companies' routers.

In the Frame Relay Forum, members are working on connections between LECs and the interexchange carriers [and] what technical specifications [are] needed.

What did you think of an idea put forth by Bill Horst, a computer specialist with the General Services Administration, to create an SMDS user group that would either submit comment to the group or have direct access to the chairpersons?

Getting users involved in the SMDS Interest Group over time is a very important thing to do. I'm sure the SMDS group would be delighted to have users involved. ■

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MANAGEMENT STRATEGIES

ENTERPRISE NETWORK STRATEGIES, USER GROUPS AND MANAGING PEOPLE AND TECHNOLOGY

Worth Noting

“Middle management is the corporate term for management activities in which there is no possible way for anybody to tell whether you’re screwing up.”

Dave Barry
American humorist
and syndicated columnist

Net managers debate pay issue for on-call IS staff

Users agree being only a beeper away takes toll.

By Wayne Eckerson
Senior Editor

Global business expansion and ever-increasing dependency on the network are putting pressure on network managers to provide 24-hour support services.

This around-the-clock vigilance raises the issue of how to compensate staffers for providing off-hours support. While most companies compensate employees with additional salary or overtime pay, no two companies’ beeper policies are the same.

This fact was evident in a recent dialogue on *Network World’s* Bulletin Board System (BBS) (see page 2 for instructions on how to access the BBS). The dialogue was initiated by one

they are also compensated for mileage.

But there were many exceptions to the rule. For example, one company rotates on-call duties every day. It pays nonexempt workers \$75 to \$200 extra per day for being on call, depending on their job level, and gives them an hour of overtime pay for each phone call they field. Salaried employees receive an hour of time off for every hour worked on call.

At the more frugal end of the spectrum, another company only reimburses staffers if they get beeped while on call and only pays for actual time worked but not less than one hour.

Getting creative

More novel arrangements include allowing on-call staffers to come to work four hours later than normal and remain available until 9 p.m. One company pays workers the equivalent of four hours of overtime for each week spent on call as well as overtime pay for time worked while on call.

Most subscribers emphasized that if companies do not compensate staffers fairly for being on call, they run the risk of employees ignoring pages.

“When you consider that you are to remain within pager range, must guarantee an immediate call back and cannot make vacation plans during that time, the question of compensation becomes quite clear,” said one subscriber, summing up the general sentiment of the group.

Patrick Springer, a network consultant at Computer Task Group, Inc. in Lowell, Mass., said most IS professionals view a pager as an intrusion of their privacy and feel they deserve to be compensated.

Springer suggests establishing two sets of guidelines — one that defines how to compensate network professionals for after-hours work and another that instructs end users when it is appropriate to page network staffers.

Springer also said companies should establish 24-hour help desks to field service calls rather than rely on on-call IS staffers to troubleshoot problems. ■

Manager Minutes

The **Securities Industry Association** will hold its annual Information Management Conference and Exhibit June 29 to July 1 at the New York Hilton.

The conference will address a range of issues, including market data feeds, decentralization of information systems management and telecommunications regulation.

Keynote speakers include Steve Jobs, cofounder of Apple Computer, Inc. and founder of NeXT Computer, Inc., Peter Bradford, New York State Public Service Commission chairman, Allan Kalb, senior vice-president at A.G. Edwards & Sons, and Thomas Jordan, president of Jordan & Jordan.

For more information, call Art Samansky or Karen San Antonio at (212) 608-1500.

The **Data Processing Management Association (DPMA)** recently named Suzanne Lattimore as its acting executive director. Lattimore was previously director of information support services at American General Life & Accident Insurance Co. in Nashville.

Founded in 1951, DPMA has 25,000 members throughout the U.S. and Canada. ■

Pager policies

Wearing a pager earns most net professionals:

- \$200 more per week from on-call duty
- 1 hour minimum of overtime pay for each call received
- 4 hours of overtime pay for every trip to the office during off-hours

GRAPHIC BY SUSAN J. CHAMPENY

subscriber who asked for help to resolve an ongoing debate within his company concerning how to compensate network professionals for off-hours and weekend on-call duties.

The subscriber asked whether network personnel who are required to carry pagers and be on call around the clock should receive higher salaries than information systems (IS) professionals who are not required to wear pagers. A slew of other subscribers responded to the query, describing how their companies compensate network professionals for being on call.

Common practices

In general, it seems most companies rotate on-call duties among staffers on a weekly basis. Each employee is given an extra \$200 in salary for the week plus one hour minimum of overtime pay for each call taken.

Staffers generally receive four hours of overtime pay if a call requires them to drive to work, and

MANAGING TECHNOLOGY

BY DAVID FERRIS

Compatibility on horizon for clients and servers

As more companies migrate to personal computer-based client/server computing, there has been great impetus to standardize communications between client applications and back-end database servers.

To date, most client applications can only access specific vendors’ databases and server platforms. This makes it difficult and costly for users to implement truly distributed computing platforms in multivendor environments.

But help is on the way. The most promising solution is IBM’s Distributed Relational Database Architecture (DRDA), which is quickly becoming a de facto industry standard for accessing remote databases.

At face value, DRDA is a means for IBM’s customers to integrate databases on their OS/2 workstations, Application System/400s and MVS/VM mainframes. But the real significance of DRDA is that it provides a standard way for applications software to communicate with databases, irrespective of the type of machine and systems software used and of whether any of the products involved come from IBM.

But first, let’s look at some of the details of how an application running on a user PC talks to the database server (see graphic, this page).

Client software uses a database access application program interface (API) to communicate with the database server. The API is a series of SQL calls that provide such functions as connecting to a database server, requesting information retrieval and moving database pointers.

Applications use the database API to format the data request packet and lower level software, usually Named Pipes, for shipping the packet over the network to the server. The server interprets the received packet and responds by issuing packets in the same special format.

While this architecture is effective, each database vendor unfortunately implements slightly different APIs and message formats, making it difficult for a single client application to uniformly access database servers from multiple vendors.

By standardizing database access methods, users could deploy PC software that accesses high-value corporate data residing on LAN servers, minicomputers and mainframes.

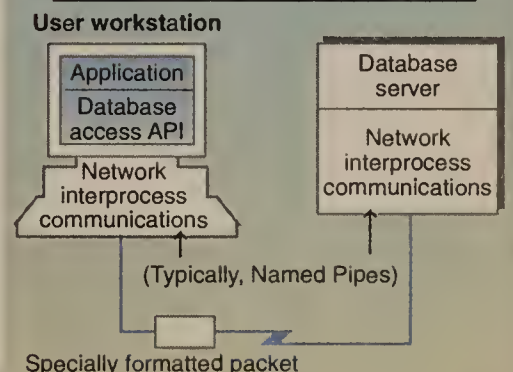
Database connectivity

To really achieve flexible database connectivity, three things are needed:

■ **An industry-standard database access API.** While each vendor’s API offers a similar basic set of SQL functions, there are many variations. For example, vendor APIs have different extensions and error return codes.

(continued on page 42)

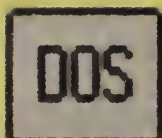
Client/server database architecture



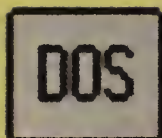
Client applications use SQL commands and a database access application program interface (API) to communicate with the database server.

SOURCE: FERRIS NETWORKS, INC., SAN FRANCISCO
GRAPHIC BY SUSAN J. CHAMPENY

☐ DOS Programs - Icon View



Harvard Graphics



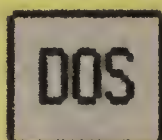
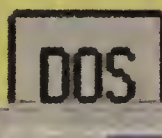
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Peachtree Accounting



CA-SuperCalc



Quattro Pro

☐ Windows Programs - Icon View



PageMaker



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CA-dBFast



WordPerfect

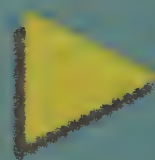
☐ OS/2 Programs - Icon



CorelDRAW!



Accounting Vision/32



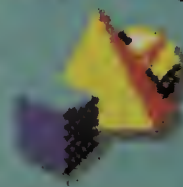
PC/Data Access
Control System



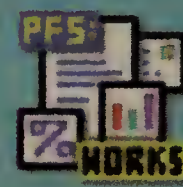
DeScribe



Enfin/3



ObjectVision



PFS: Works



Publisher's
Paintbrush

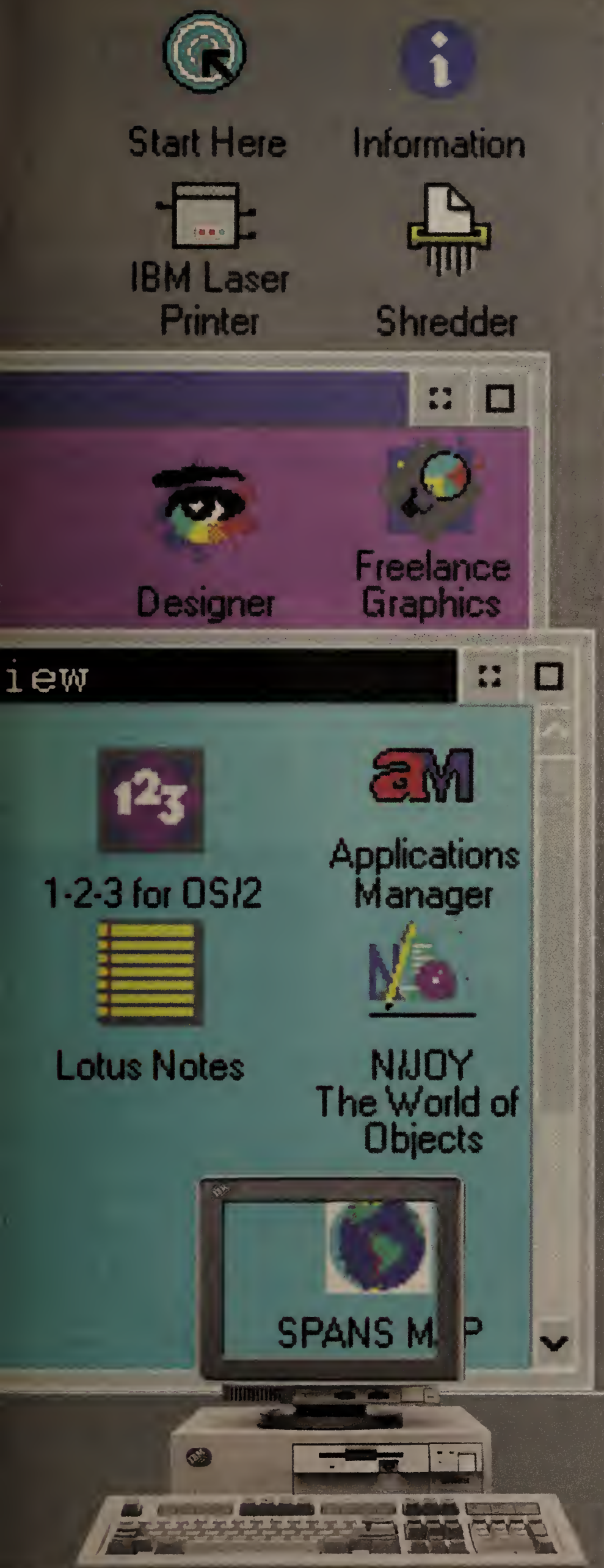


OS/2 System



Master Help
Index

OS/2



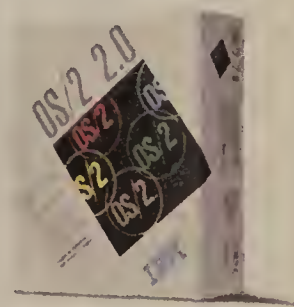
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IBM

Compatible clients, servers

continued from page 39

■ **An industry-standard set of message formats used to connect the workstation and database server.** Today, each database server vendor defines its message formats.

■ **An industry-standard set of message formats that different database servers can use to exchange information.** This will enable an application to access a database that is distributed across several servers.

All the major database vendors are aware of the need for these standards and are actively working to create them.

One set of efforts comes from the SQL Access Group. This group has defined a preliminary specification for a database access API and application-to-database and database-to-database message formats. Last summer, 16 vendors participated in a demonstration of the specification that showed various SQL front-end applications on client workstations accessing several different SQL back-end database servers.

However, the specification has not been formally released and many vendors are not confi-

dent that a viable specification will emerge from the group.

Another set of efforts is taking place under the auspices of ANSI. That group's specification is called Relational Database Architecture. Like the SQL Access Group, ANSI's work is still at an early stage of development.

The other potential standard is DRDA, which has three components:

■ **A standard database access API defined to work across all of IBM's main products, especially the PC, AS/400 and MVS/VM mainframes.** In IBM jargon, it is the Common Programming Interface for Database, or CPI-Database.

■ **A standard set of messages that CPI-Database sends to IBM relational databases.** This would include DB2 on a mainframe, SQL/DS on low-end mainframes, the relational engine of the AS/400 and OS/2 Extended Edition's Database Manager.

■ **A standard set of messages that IBM's different databases can use to act as a unified database.**

IBM's efforts are well under way. Many of the components have gone beyond mere formal specifications and are now avail-

able. Therefore, its work is way ahead of that of the SQL Access Group and ANSI.

It should also be noted that IBM's mainframe and minicomputer databases contain much of an organization's most valuable data. It is a high priority to grant PC software access to this information. Therefore, it is not surprising that DRDA has met with immediate approval.

Manufacturers of workstation software want to write to the CPI-Database interface to allow their products to access high-value mainframe and minicomputer data. Conversely, vendors of database server software want to support CPI-Database so they can offer a wide variety of workstation software.

In September 1991, many of the major vendors in the PC network field — including Borland International, Inc., Gupta Technologies, Inc., Novell, Inc. and Oracle Corp. — announced their intention to support DRDA.

Thanks to Big Blue, it won't be long until your favorite PC packages are able to access a wide variety of databases. High-value information hidden away on VAXes, AS/400s and mainframes is about to be made a lot more accessible. ■

Company	Product	FDDI-to-FDDI		Bridging	
		Pps	Mbps	Pps	Mbps
Ascom Timeplex, Inc.	Time/LAN 100 bridge/router	13,274	48.4	7,657	48.7
Cisco Systems, Inc.	AGS+ bridge/router	30,534	94.6		
Coral Network Corp.	CX 1600 bridge/router	24,520	81.2	140,780	99.4
Crescendo Communications, Inc.	SBus Adapter FDDI interface				
Develcon, Inc.	220LM3-SA token-ring bridge				
Fibronics International, Inc.	FX8210B and FR 9500				
Hewlett-Packard Co.	27286A token-ring bridge/router				
Netronix, Inc.	TokenMaster 2000 token-ring bridge				
Network Peripherals, Inc.	NP-SB/S FDDI interface				
Penril DataComm Networks, Inc.	Series 2500 FDDI bridge				
Proteon, Inc.	CNX 500 bridge/router	27,272	52.2		
Sigma Network Systems, Inc.	ECS/1 bridge/router				
Sun Microsystems, Inc.	FDDI/2 SS2				
Synernetics, Inc.	LANplex 5012 hub with bridging module				
SynOptics Communications, Inc.	3522 token-ring bridge module				
3Com Corp.	NetBuilder token-ring bridge				
	NetBuilder II bridge/router	48,904	92.2	50,356	92.2

Mbps = Megabits per second

Pps = Packets per second

Tests yield mixed results

continued from page 19

that all the bridges and routers tested could adequately support both 56K bit/sec and T-1 speeds.

No testing was done to gauge how well the devices could sup-

port T-3 links, Bradner said, since Cisco is the only participant that currently provides a T-3 interface.

Proteon's CNX 500 bridge/router far outperformed its competition in routing TCP/IP traffic between two token-ring LANs. The device was able to forward



Bridges, routers take Harvard exams

IP through Sun SS2		FDDI-to-FDDI through Ethernet		4 Ethernet-to-4 Ethernet via FDDI								Local token ring - 16M bit/sec								Token ring via T-1 WAN							
				Bridge 1-way		Bridge 2-way		IP 1-way		IP 2-way		IP		Novell IPX		SRB		AppleTalk		IP		Novell IPX		SRB			
Pps	Mbps	Pps	Mbps	Pps	Mbps	Pps	Mbps	Pps	Mbps	Pps	Mbps	Pps	Mbps	Pps	Mbps	Pps	Mbps	Pps	Mbps	Pps	Mbps	Pps	Mbps	Pps	Mbps		
		13,125	9.8					16,785	38.9	17,320	39.4	2,100	15.7							1,128	1.53			115	1.53		
		14,027	9.9	22,320	39.3	19,525	39.4	46,663	39.2	53,032	39.4	2,128	6.5	2,384	6.5	11,581	7.7	1,983	1.53	2,552	1.53	2,753	1.53				
		13,863	9.8																								
8,438	30.0																										
		4,630	9.9	7,618	38.9													3,157	8.5								
																		1,583	2.8								
																			3,822	1.53	3,903	1.53	2,980	1.48	1,836	1.53	
																		4,503	9.6								
5,794	40.0																										
				42,409	39.4	44,027	39.4																				
		12,027	9.8					17,856	39.2	20,237	39.2	14,828	15.7	4,465	6.0	14,775	15.7					3,903	1.45				
				59,433	39.4	59,266	39.4	53,564	39.4	59,270	39.4																
5,055	50.0	4,589	9.8																								
		14,880	9.9	58,925	39.4	59,147	39.4																				
																		7,832	15.7								
																					1,571	1.53			3,248	1.53	
		14,822	9.9					41,664	38.9																		

SRB = Source route bridging

SS2 = SPARCstation 2 with FDDI routing software

SOURCE: HARVARD UNIVERSITY, CAMBRIDGE, MASS

GRAPHIC BY SUSAN J. CHAMPENY

packets at more than 14,000 packet/sec and source route bridging traffic at about the same rate. The average performance of other devices was between 2,000 and 4,000 packet/sec.

Bradner also tested a bridge/router's ability to fragment TCP/IP packets, which is impor-

tant when the so-called firehose effect occurs while routing from a high-speed LAN to a lower speed LAN, such as FDDI to Ethernet.


The surprise finding, he said, is that most routers continued to forward packets reasonably well despite an onslaught of data coming off the FDDI link.

"There have been numerous reports that bridge/routers do a poor job at fragmenting IP packets, but we found that this isn't the case," Bradner said.

A total of 16 different vendors' wares were included in the testing. Wellfleet Communications, Inc. was scheduled to par-

ticipate, too, Bradner said, but dropped out at the last minute, citing a disagreement with the testing procedure. Wellfleet objected to a policy that permitted vendors to submit routing code that is not currently available. The policy required that any code used should ship to users by Au-

gust.

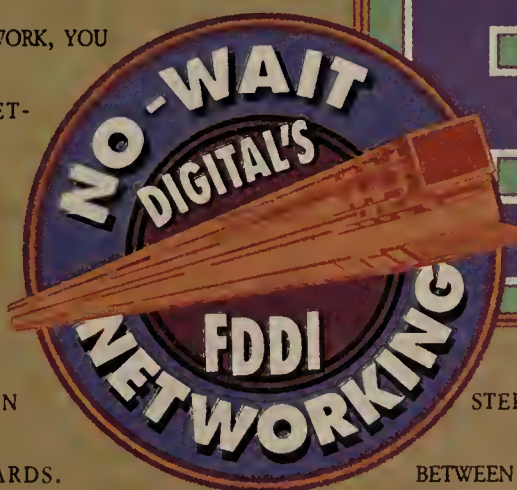
The devices were tested using TCP/IP, Novell, Inc.'s Internetwork Packet Exchange (IPX) and Apple Computer, Inc.'s AppleTalk protocols. The source route bridging algorithm was also included during tests performed on token-ring LANs. 

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TOLL FRAUD

BY TOM FERMAZIN

Voice processing vendors: Unite to help curb toll fraud

It's time for voice processing system manufacturers to band together in the war against system misuse, abuse and toll fraud, and develop a consistent industrywide program to address the problem. The damage incurred from misuse, abuse and fraud is perhaps the most urgent problem facing the voice processing industry today. Denying that the problem exists does not help the situation. If it is not dealt with, fear of massive toll fraud losses will discourage potential customers from purchasing systems and existing users will be discouraged from using the technology to its fullest potential.

To dispel user fears, vendors must join together to develop standards that specify a minimum level of security on every system, regardless of its size or manufacturer. These standards should be based in part on user input so they can address the concerns of those who administer and use the systems regularly. Once these standards are developed, vendors must agree to adopt them.

Also, manufacturers should assist users in identifying potential security weaknesses in their systems. Then manufacturers must bring together the

industry's best engineering minds to codevelop security-related hardware and software features that plug those security holes. As part of the basic training package for every newly installed system, vendors should also offer courses that spell out how to use these security features and procedures.

For security standards and products to be truly useful, vendors need to share information about incidents of misuse, abuse and fraud with one another. This sharing will enable manufacturers to identify the scope of the problem and focus on the areas of greatest concern. In this way, manufacturers will send a public and clearly articulated signal to phone hackers and users that they are not going to let the problem escalate.

All this talk of eliminating misuse, abuse and fraud is well and good, but voice processing manufacturers compete with one another, don't they? So how likely is it that they will come together in support of their collective advantage? It is very likely, indeed.

Two highly visible precedents have already been set. Leading manufacturers got together to develop the Audio Messaging Interface Specification, which defined a communications mechanism that enabled voice messaging systems to be networked together. They also drafted the Voice Messaging User Interface Forum standard, which established a common set of user interface codes for accessing and using voice mail systems.

Voice processing manufacturers must make an effort now to deal with the security problem. In fact, they would do well to heed the words of Benjamin Franklin, who said, "We must all hang together, or assuredly we shall all hang separately." ■

Fermazin is a senior technology analyst for Amoco Corp. in Chicago and the author of the recently published report "Voice Processing System Security: Misuse, Abuse and Fraud Detection and Prevention" (Robins Press: New York).

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EDITORIAL

Call for Innovation proves IT investment pays dividends

It's fashionable today for some high-tech revisionists to claim corporate America has seen little return on investment in information technology.

Sure, some companies struggle to quantify the returns from technology investments. But not all. Witness the winners of the 1992 Call for Innovation (CFI) competition, cosponsored by the International Communications Association and *Network World*.

Among this year's winners was Daniel Gonos, manager of telecommunications for Domino's Pizza, Inc. Gonos and his staff worked with AT&T to develop a service, dubbed StoreFinder, that will enable Domino's to publish a single telephone number and have any

call routed automatically to the store nearest the caller.

StoreFinder is not only a powerful marketing vehicle; it also will improve customer service and save Domino's millions in Yellow Pages advertising. *Network World* broke the StoreFinder story, which was picked up by the national media, including the *New York Times*.

Also recognized were John Livingston, executive vice-president and chief information officer for National Car Rental System, Inc., and Kenneth Russo, director of Unisys Corp.'s U.S. Information Systems Open Systems Center.

Livingston and his team developed a wireless data communications system that enables employees to communicate with

remote hosts from National's car return lots, reducing damage losses and helping improve vehicle utilization to the tune of \$4 million a year.

Russo put Unisys' open systems technology on display in its 25 demonstration centers, making real the concept of the "virtual" demo center in which customers can test-drive products that aren't necessarily housed at the site they're visiting. The system shaved nearly \$5 million a year off the cost of equipping and upgrading each center.

While their applications are diverse, the CFI winners have something in common. They're living proof that technology applied with insight and vision can have a big payback. For that, we congratulate them. ■

OPINIONS

DISTRIBUTED COMPUTING

BY JOHN R. RYMER

Large vendors are a barrier to distributed object computing

Distributed object-oriented computing clearly has the potential to become the dominant network application architecture for the remainder of the 1990s and beyond.

Distributed object technology promises to give users cost efficiencies and configuration flexibility by making it possible to spread application processing chores among multiple local-area network workstations and servers. A host of leading-edge users are busily trying to implement distributed object-oriented computing technology.

American Airlines, Inc., American Express Co., DHL World Airways, Inc., General Motors Corp. and Salomon Brothers, Inc. are using the technology as the basis for developing a new generation of mission-critical applications.

Unfortunately, these early users have had little help in implementing the technology from large vendors that are baffled by their requirements.

Instead, they have had to pretty much go it alone. And until large vendors can provide the tools to develop distributed object-oriented applications, early users will have to continue inventing the tools they need.

Likewise, users who want to get into the game will have to come to grips with the need to invest in building the missing pieces of the infrastructure. Because this is such a daunting task, some users will never take advantage of the opportunities presented by distributed object computing.

Large systems vendors are failing to meet users' needs in four major areas. First, they aren't providing complete platforms, ones that comprise much more than networking products, hardware and software. These platforms also include a set of network services such as direc-

tory and transaction processing services, as well as a complete set of application program interfaces and support for multiple programming languages.

For users with experience in the development of object-oriented applications, a distributed object computing platform must also support a set of software objects that can be used by different applications. These objects consist of code that defines basic data structures, such as arrays,

The best distributed computing technologies are coming from smaller companies.

▲▲▲

strings, date and time, as well as what an operating system, database and communications channel are, which makes the objects inherently portable.

Experienced users also feel that a platform must include objects that define operations such as print, copy, request and respond.

Second, no major vendor currently offers products that deliver on one of the key promises of distributed object computing — the ability for applications to run across the multivendor platforms most users have installed today.

Third, vendors are providing their own flavors of distributed computing services, communications services, operating systems and so forth.

As vendors adopt standard services such as the Open Software Foundation, Inc.'s Distributed Computing Environment and standard interfaces such as

the Object Management Group's Common Object Request Broker Architecture, users will find it easier to build applications that span vendor platforms.

Fourth, vendors that have built distributed object computing products can offer users only limited assistance with migration planning and cost-justification.

The reason large vendors are not building products that adequately meet user requirements seems to be money. Large systems vendors understand how to profit by selling integrated hardware and software platforms. However, they don't understand how to profit by selling users objects that can be run on the platforms of other vendors.

In the meantime, the best distributed object computing technologies are coming from smaller companies. Object-oriented database vendors such as Object Design, Inc. and Versant Object Technology, Inc., distributed object management vendors such as Horizon Strategies, Inc. and HyperDesk Corp. and language and tools vendors such as Borland International, Inc., Digital, Inc., ParcPlace Systems, Inc. and Rogue Wave, Inc. seem to be more in tune with user needs. Five years from now, some of these small vendors will be large vendors.

In distributed object computing, users understand the information systems environment much better than vendors do. Until the use of this technology spreads, users must help themselves or team with smaller companies. ■

Rymer is vice-president of the Patricia Seybold Group in Boston and editor in chief of Patricia Seybold's Network Monitor, a monthly report devoted to distributed computing.

ATTENTION X.25 SWITCH VENDORS: *Network World* would like to list your product in a Buyer's Guide for the July 20 issue. This Buyer's Guide will cover X.25 switches only. It will not cover packet assembler/disassemblers.

To obtain a survey form, please call either Charles Bruno, features editor, at (508) 875-6400, ext. 414, or Jonathan Bransky at (703) 903-5000. Completed survey forms must be returned by June 5.

TELETOONS

BY FRANK AND TROISE



LETTERS

Start at the beginning

The recent column "U.S. businesses: Investing in education pays dividends" (NW, May 4) proposes some terrific and creative strategies for improving the pool of well-educated candidates for the rapidly changing communications technology industry. However, it focuses exclusively on postgraduate programs in local colleges and ignores other crucial, equally needy and deserving educational programs.

The educational system in this country is in dire need of help at all levels. From the preschool to the postgraduate level, our educational system is under increasing pressure to develop high-quality candidates for all segments of the job market. At the same time, public funding for our educational institutions is falling to dangerously low levels. We are failing to provide for our own future.

Educating a young person is similar to erecting a building. You start by providing a solid

foundation and then build each level with intricate care. A weakness at any point jeopardizes the entire structure. To obtain good postgraduate scholars, we must have good grammar and middle school pupils, good high school students and good undergraduates.

We, the business community, need to become more involved with our educational system. We should look for weak links in the educational chain in our communities and develop ways to strengthen or reforge them. If we do, we will benefit, as well as the community and the nation as a whole.

Michael Haggerty
Springfield, Mass.

Network World welcomes letters from its readers.

Letters should be typed and double-spaced. Mail them to Editor, Network World, 161 Worcester Road, Framingham, Mass. 01701.

Letters may be edited for space and clarity.

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INTERNETWORKING

The hubbub about hubs

Network managers entering the market for intelligent wiring hubs must feel like they're shopping at a K Mart store and the blue light signifying markdowns keeps flashing around them.

Hub vendors have been slashing prices on low-end models, driving down the cost per port to well under \$100 in many cases. And new models hitting the market are either priced aggressively or offer such standard features as network management down to the port level.

At the high end of the market, prices have not dropped significantly, but vendors are bundling advanced features such as net management, increased security and greater flexibility for connecting different types of local-area networks.

Despite these trends, there are

still a handful of critical buying factors that will help differentiate the ever-growing range of intelligent and basic local-area network wiring hubs.

Some features, such as the number of available ports and expansion slots as well as the number of LANs supported, will always be considerations when comparing hubs. Likewise, the types of cabling and LANs supported usually play a role in the selection of a hub.

Increasingly, however, users are looking at factors such as net management, wide-area support and internetworking capabilities as the key factors that influence a hub purchase.

CHART • GUIDE

A Buyer's Guide chart beginning on page 51 compares the features of 130 hubs from 60 vendors.

Price cutting creates buyer's market at the low end, while vendors focus on advanced features at the high end.

The wiring hub market has split into a high-end and low-end side.

Low-end hubs generally are stand-alone models or personal computer board-based devices that come with a fixed number of ports. They typically lack network management capabilities and are used to connect departmental or remote site users.

High-end hubs are offered as a chassis unit with plug-in expansion modules that support different LAN connections and come with built-in net management software, often including Simple Network Management Protocol support. These hubs also allow a net manager to monitor and report on network activity such as broken cables and network traffic loads.

(continued on page 48)

By SALVATORE SALAMONE

(continued from page 47)

Chassis-based hubs are flexible and offer a growth path because users can initially deploy them for connecting department nodes and eventually load them with cards that support multiple departments within a building.

The top-of-the-line models in the high-end hub market include net management down to the port level. This feature lets a net manager activate and deactivate ports remotely so they can configure networks from a central location.

Net managers contacted for this Buy-

er's Guide said that when it comes to low-end hubs, price is the prime selection criterion.

Price

Vendors have responded to market demands by cutting prices by as much as 40% on low-end units. In March, for instance, Hewlett-Packard Co. slashed the price of its HP EtherTwist Hub Plus 48, a 48-port 10Base-T hub, from \$7,999 to \$4,795, bringing the per-port cost to just under \$100.

Also within the past few months, other

hub vendors have introduced low-priced hubs. Cameo Communications, Inc., a start-up company in Nashua, N.H., recently introduced a line of intelligent Ethernet hubs that sell for as little as \$149 per managed port.

For users that do not need managed hubs, LanCast of Amherst, N.H., and MiLAN Technology Corp. of Sunnyvale, Calif., offer hubs with exceptionally low per-port costs. LanCast lowered the price of its ENT-4392 Field Upgradable Smart Hub to less than \$50 per port. And MiLAN's Hub Card gives net managers the ability to connect

users in work groups for under \$50 per 10Base-T port.

In the last few months, many of the low-end hubs introduced have been targeted for use in remote sites or for use by small departments.

For example, in March, Ungermann-Bass, Inc. introduced its Access/One 10Base-T Concentrator System, which is an extension of the company's Access/One enterprise hub. The new unit is aimed at departmental users and remote sites.

That same month, Kodiak Technology, Inc. rolled out a low-end hub. Kodiak's 12Plus2 External Hub, a 14-port 10Base-T device that supports thin-wire Ethernet, costs \$999, or about \$83 per port.

In addition, 3Com Corp. introduced its LinkBuilder 10BT line of 10Base-T hubs, which includes the LinkBuilder 10BTi 12-port, an SNMP-based intelligent hub. The

“Today, you have decentralized LAN technology,” says Frankle. “Companies have got to tie together these islands of technology.”

▲▲▲

10BTi is priced at \$1,995, or about \$166 per port.

This activity at the low-end is the result of users' requests to share information enterprisewide, including small offices.

“Today, you have decentralized LAN technology,” says Susan Frankle, a research analyst at the Framingham, Mass., market research firm International Data Corp. “Companies have got to tie together these islands of technology.” And low-end hubs are one way to tie in small departments and remote users.

The activity in the low-end of the market is evidence that vendors from all corners of the LAN market are joining in and offering hubs.

In February, Intel Corp. — primarily a microprocessor manufacturer — introduced its EtherExpress TPE Hub boards, which are manageable hub boards for PC-based servers on 10Base-T Ethernet LANs. And AMP, Inc., a company known for its connectors, used its expertise in connector technology to design a hub, which it introduced in January.

That's not to say established leaders in the hub market are standing by idly. Ungermann-Bass's new 10Base-T hub is a first for the company, which typically has offered high-end, intelligent wiring hubs.

Port support

The number of ports, or node connections, supported by a hub is directly proportional to the type of hub a user installs. A stand-alone hub designed for remote offices or small work groups typically supports from eight to 16 ports, while larger chassis systems may offer as many as a few

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hundred ports when fully configured.

In the Buyer's Guide, Netcor, Inc.'s RMX Ethernet hub supports as many as 567 ports, and Fibronics International, Inc. offers as many as 512 ports in its Unix V 892 chassis-based system.

Hughes LAN Systems, Inc.'s Enterprise Hub supports a maximum of 336 ports spread over 14 plug-in modules. AMP's AMPTrac 16 Intelligent Token Ring Concentrator offers as many as 260 ports aggregate across 13 plug-in modules, followed closely by Dowty Network Systems, Inc.'s ScaNet System Center with 256 ports on 16 modules.

Among the market leaders, Cabletron Systems, Inc. offers 168 ports on its MMAC-8FNB, SynOptics Communications, Inc. offers 144 ports on its LattisNet Model 3000 Premises Concentrator and Ungermann-Bass' Access/One supports as many

ken-ring hub, the Andrew 8000 Series Slim Hub. The product supports as many as 32 shielded and unshielded twisted-pair wire connections at a cost of \$380 to \$4,875, depending on the configuration.

In recent months, companies such as Cabletron and SynOptics, which have a stranglehold on the Ethernet hub market, have introduced new hubs for token-ring nets.

Cabletron added token-ring modules, called the Token Ring Media Interface Module (TRMIM)-24A and TRMIM-44A, that can be used with the company's Multi

Media Access Center wiring hubs. The TRMIMs offer 24 ports for shielded and unshielded twisted-pair cable connections and meet the IEEE 802.5 specifications.

In March, SynOptics introduced a token-ring module for its LattisNet Model 3000 intelligent hub. The module, called the 3505A UTP Host Module, plugs into a LattisNet Model 3000 intelligent hub and provides 16M bit/sec token-ring connections. The 3505A, which is priced at \$2,095, can support as many as 132 token-ring stations at a distance of up to 100 meters from the hub.

Cabletron and SynOptics are not the only Ethernet hub makers moving to offer token-ring support. For instance, in February, Chipcom expanded its token-ring hub line by introducing three modules for its ONLine System Concentrator intelligent switching hub. One of the modules, the ON-line Token Ring Media Module, provides 20 ports for connecting devices to a token-ring LAN. And as many as seven Token Ring Media Modules can be housed in an ONLine System Concentrator. This provides a total of 140 token-ring ports in a
(continued on page 52)

Your Guide to Multi-LAN Hubs

“**S**eventy percent of Fortune 500 companies have both Ethernet and token-ring networks,” says Gartner Group's Redman.



as 120 ports. Chipcom Corp.'s ONLine System Concentrator offers up to 180 ports.

On the low end, Engage Communications, Inc.'s EN+, Madge Networks, Inc.'s Local Ringhub, Optical Data Systems, Inc.'s ODS 1085-4 and Pivotal Technologies, Inc.'s MAUcard each offer four ports.

LAN support improves

Hub vendors have served up a slew of Ethernet models that support the IEEE 10Base-T standard for running Ethernet over telephone-type wiring. The 10Base-T activity has been frenzied as vendors have rushed to position themselves as low-cost suppliers of hubs.

However, vendors have rolled out hubs with support for token ring, Fiber Distributed Data Interface and Apple Computer, Inc. AppleTalk nets, largely in response to the increased diversity of those LANs at user sites.

“Seventy percent of Fortune 500 companies have both Ethernet and token-ring networks,” says Bill Redman, vice-president at the Stamford, Conn.-based Gartner Group, Inc. “So the demand for centralized wiring will increase as the number of LANs continues to grow.”

Of those vendors cited in the Buyer's Guide charts, Andrew Corp. and Proteon, Inc. are the leading suppliers of token-ring hubs. They have maintained their leadership positions by introducing new models and by enhancing existing products to support greater numbers of nodes and offer improved management.

In February, for instance, Andrew introduced a low-cost 4M/16M bit/sec to-

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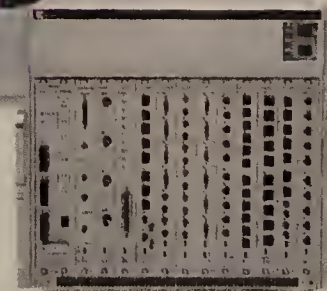
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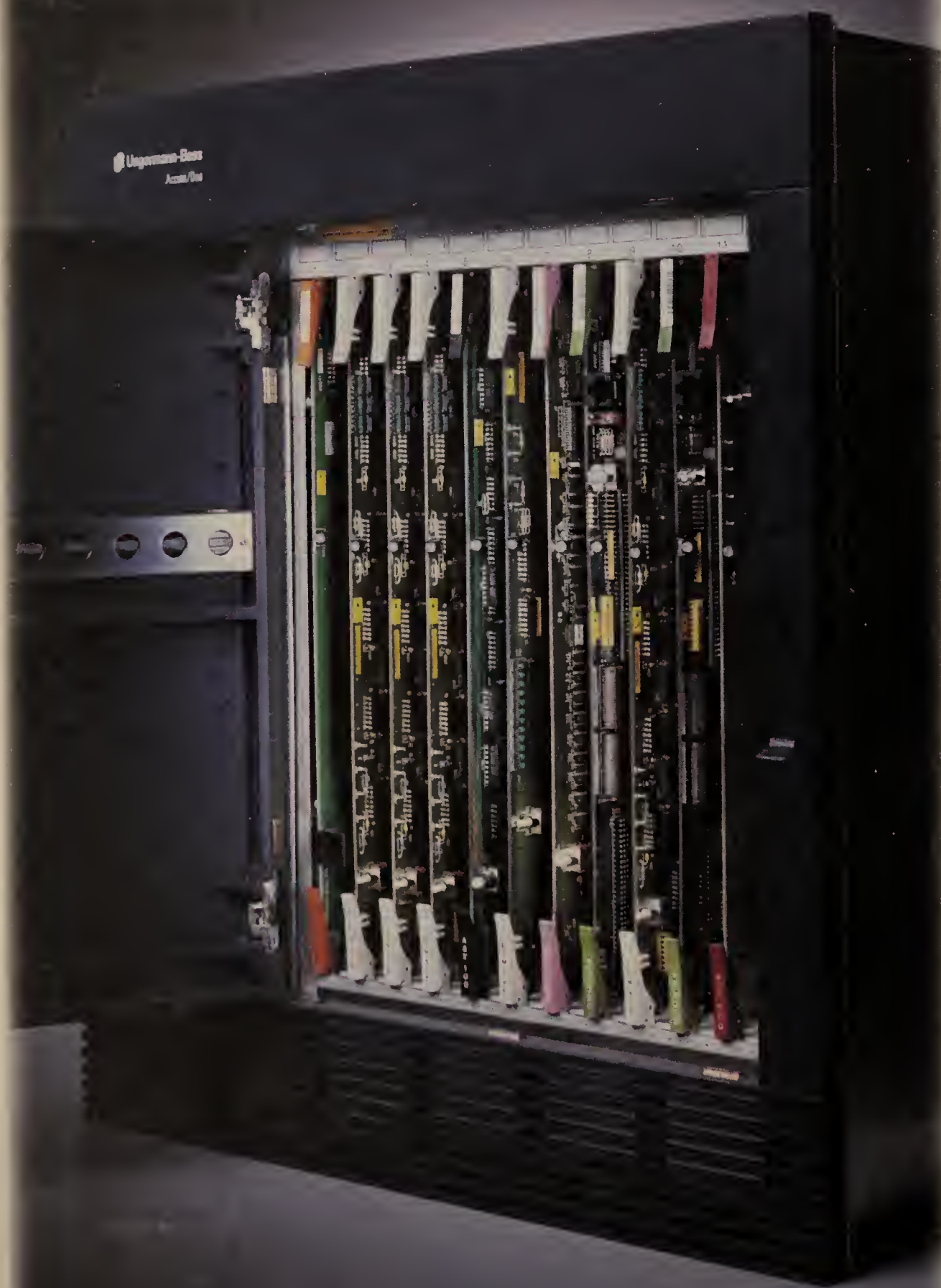
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- 1 ☐ Request for sales call
2 ☐ Request for proposal
3 ☐ Request for information

3. Scope of purchase responsibility

- 7 ☐ Enterprise wide
8 ☐ Departmental

2. Purchase timeframe

- 4 ☐ Within 60 days
5 ☐ Within six months
6 ☐ Within one year

4. Purchase influence/number of sites

- 9 ☐ One site 11 ☐ 10-20 sites
10 ☐ 2-9 sites 12 ☐ 21+ sites

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145
146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175

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101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145
146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175

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101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145
146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175



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Hubs (continued on page 53)

Company	Telephone	Product	Hub type	Maximum number of:			LAN types					Cabling					WAN support			Net management		Management protocols			Bridging/ Routing	Starting price				
			C = Chassis B = Board S = Stand-alone	Ports	LANs (V = Varies)	Slots	AppleTalk	Ethernet	FDDI	Token ring	Other	Coaxial	Fiber	IBM	Shielded twisted pair	Unshielded twisted pair	Other	Frame relay	T-1	X.25	Other	Alarms	Fault management	Traffic monitor	CMIP	CMOT	SNMP	Other	A = AppleTalk E = Ethernet F = Fiber T = Token ring O = Other	
Accton Technology Corp.	(800) 926-9288	EtherHub-12i	S	12	1	-	✓					✓				✓						✓	✓	✓			✓	E	\$1,095	
Accunetics, Inc.	(800) 446-7769	NMS-1000	C	32	5	8					✓	✓				✓						✓	✓	✓				✓	O	\$2,750
		NMS-2000 Intelligent 10BaseT Repeater	C	24	2	2		✓					✓				✓						✓	✓	✓				✓	E
ADC Fibermux	(818) 709-6000	Crossbow	C, S	140	14	14	✓	✓	✓	✓		✓	✓	✓	✓	✓						✓	✓	✓			✓	E	\$4,000	
ADI Systems, Inc.	(408) 944-0100	Aquila AQ-IHUB-12TP	B	13	5	-		✓				✓				✓						✓	✓	✓			✓	E	\$899	
Advanced Computer Communications	(800) 444-7854	ACCes 4500	S	21	11	11	✓	✓		✓					✓	✓		✓		✓		✓		✓		✓		E, T, A	\$14,995	
Allied Telesis, Inc.	(800) 424-4284	AT-3600 family	C, S	104	1	8		✓				✓				✓	✓					✓	✓	✓			✓	E	\$1,795	
AMP, Inc.	(800) 522-6752	AMPTrac 16 Intelligent Token Ring Concentrator family	S	260	V	13				✓			✓		✓	✓						✓	✓	✓			✓	-	\$4,660	
Andrew Corp.	(800) 733-0331	MAU/8500-8	S	8	1	8				✓				✓	✓	✓						✓	✓	✓				T	\$3,595	
Asante Technologies, Inc.	(800) 662-9686	Asante Hub 1012	S	13	1	1		✓								✓						✓	✓	✓		✓		E	\$1,499	
Bytex Corp.	(508) 366-8000	The 7730 Intelligent Switching Hub	C	40	3	6		✓		✓			✓		✓	✓			✓	✓	✓	✓	✓	✓			✓	✓	E, T, A, O	\$6,000
		The 7760 Intelligent Switching Hub	C	144	32	17		✓		✓				✓		✓	✓			✓	✓	✓	✓	✓	✓			✓	✓	E, T, A, O
Cabletron Systems, Inc.	(603) 332-9400	MMAC-3FNB	C	48	2	3	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	E, A	\$1,250
		MMAC-5FNB	C	96	4	5	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	E, A	\$1,550
		MRXI 24	S	24	1	2		✓					✓	✓		✓	✓	✓					✓	✓	✓		✓	✓	-	\$3,995
		MiniMMAC	S	13	1	3		✓					✓	✓		✓	✓	✓					✓	✓	✓		✓	✓	-	\$995
		MMAC-8FNB	C	168	7	8	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	E, A
Cameo Communications, Inc.	(508) 546-6402	UltraHub 1000 Workgroup Hub System	C, S	60	4	-		✓				✓	✓			✓							✓	✓	✓		✓		E	\$779
		UltraHub 5000 Intelligent Concentrator	C, S	132	4	12		✓					✓	✓			✓						✓	✓	✓		✓		E	\$4,720
Chipcom Corp.	(508) 460-8900	ONline System Concentrator	C, S	48	14	6		✓	✓	✓		✓	✓		✓	✓			✓		✓		✓	✓	✓		✓	✓	E, T, F	\$1,695
		ONline System Concentrator	C, S	180	14	17		✓	✓	✓			✓	✓		✓	✓			✓		✓		✓	✓		✓	✓	E, T, F	\$3,995
Clearpoint Research Corp.	(508) 435-2000	Constellation Little Dipper	C, S	10	13	8		✓				✓							✓		✓	✓		✓			✓	E	\$6,000	
Dayna Communications, Inc.	(801) 531-0600	DaynaStar Hub-12	S	13	-	-		✓				✓				✓							✓	✓				E	\$995	
Develcon Electronics, Ltd.	(800) 667-9333	T Hub 1132	C	132	1	11		✓				✓	✓			✓							✓	✓	✓	✓	✓	✓	E, T, F	\$2,025
		T Hub 1048	C	52	1	4		✓					✓	✓			✓						✓	✓	✓	✓	✓	✓	E, T, F	\$1,325
Digital Equipment Corp.	(800) 344-4825	DEChub 90	C, S	64	1	8		✓				✓				✓							✓	✓	✓		✓	✓	E	\$1,540
Dowty Network Systems, Inc.	(415) 508-2500	ScaNet System Center	C, S	256	16	16	✓	✓			✓	✓	✓	✓	✓	✓			✓	✓	✓		✓		✓	✓	✓	E, F, A	\$2,200	
DuPont Electronics, Electro-Optic Products Group	(800) 888-5261	LAN One Universal Concentrator	C	60	2	17		✓		✓		✓	✓		✓	✓								✓			✓	✓	E	\$1,760
		Paragon Intelligent Networking System	C	228	4	20		✓	✓	✓	✓		✓	✓		✓	✓						✓	✓	✓		✓		E	\$6,880
Engage Communications, Inc.	(408) 688-1021	EN+	S	4	4	4	✓	✓				✓				✓			✓	✓	✓	✓	✓				✓	E, A	\$2,995	
Farallon Computing, Inc.	(510) 596-9000	PhoneNet StarController EN Series 500	S	13	1	-	✓	✓								✓							✓	✓	✓			✓	-	\$1,895
Fibronics International, Inc.	(508) 778-0700	FX8610 Workstation Server	C	12	2	6		✓	✓							✓							✓	✓	✓		✓		E, F	\$19,800
		NDS 192 Hub	S	24	4	1		✓		✓			✓	✓	✓	✓	✓	✓										-	\$1,390	
		Unimux V 892	C	512	1	8		✓		✓			✓	✓	✓	✓	✓	✓					✓	✓	✓		✓		-	\$2,200
Gandalf Systems Corp.	(609) 424-9400	Access Hub	S	132	6	11		✓		✓		✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓		✓		E, T	\$8,600	
Gateway Communications, Inc.	(800) 367-6555	G/EtherTwist 8-Port Hub	S	8	2	-		✓								✓	✓						✓	✓			✓	-	\$500	
General Technology, Inc.	(800) 274-2733	Smart Network Management SMAU, GT16N	S	16	1	-				✓				✓	✓	✓							✓	✓			✓	-	\$1,099	
Hewlett-Packard Co.	(800) 752-0900	HP ThinLan Hub Plus	S	10	V	-		✓				✓	✓							✓	✓		✓	✓	✓		✓		E, T	\$2,900
		HP Fiberoptic Hub Plus	S	8	V	-		✓					✓	✓							✓	✓		✓	✓		✓	✓	E, T	\$3,299
		HP EtherTwist Hub Plus 48	S	48	V	-		✓					✓	✓	✓	✓	✓				✓	✓		✓	✓		✓	✓	E, T	\$4,795
		HP EtherTwist Hub Plus	S	12	V	-		✓					✓	✓	✓	✓	✓				✓	✓		✓						

(continued from page 49)
single, fully managed hub.

Another player that entered the token-ring hub market is Star-Tek, Inc. of Northborough, Mass. The company introduced its Focus Series of hubs that support unshielded and shielded twisted-pair token-ring connections. The Focus hubs support as many as 260 users on a single ring and cost about \$115 per port.

The 260 users on a single ring supported by Star-Tek's product is a large number to be supported by one hub. Usually, a hub cannot support that many token-ring users

due to jitter, a form of signal distortion that can occur when unshielded twisted-pair cabling is used to transmit data at high data rates.

Star-Tek takes a unique approach to jitter reduction. The company spent 1½ years working on a customized chip that uses phase-locked loop technology to reduce the jitter problem.

Star-Tek has also proposed its method of jitter reduction to the IEEE 802.5 committee.

Some other vendors in the Buyer's Guide chart that support token-ring LANs

include Bytex Corp., Hughes LAN Systems, Madge Networks, Optical Data Systems and Ungermann-Bass.

Bridging and routing

Hub makers are intent on positioning their products as the center of a user's LAN activity, and consequently, many vendors are incorporating bridging and routing modules into their units. This allows users to pass LAN data among the different LAN types supported by the hub, rather than maintain a separate unit to do so.

In the Buyer's Guide, 99 of the 130

models listed offer some form of bridging or routing support, a prime indication that internetworking functionality is being folded into hubs.

Initially, however, that functionality is offered in the form of optional bridging/-routing modules that plug into a hub chassis.

Of those hubs listed in the Buyer's Guide charts, Lannet Data Communications, Inc.'s LET-18 and LET-36, Optical Data System's ODS family, SynOptics' LattisNet Model 3000 Premises Concentrator and Ungermann-Bass' Access/One deserve special attention for supporting bridging and routing for AppleTalk, Ethernet, token-ring and FDDI nets.

Media

In addition, support for different media is a key when purchasing a hub. For instance, the Dana-Farber Cancer Institute in Boston designed its network around a fi-

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Management improves

SNMP has pretty much become the de facto standard for hub management. When using a hub with SNMP capabilities, a net
(continued on page 54)

Hubs (continued on page 54)

Company	Telephone	Product	Hub type	Maximum number of:			LAN types					Cabling					WAN support			Net management		Management protocols			Bridging/ Routing	Starting price					
			C = Chassis B = Board S = Stand-alone	Ports	LANs (V = Varies)	Slots	AppleTalk	Ethernet	FDDI	Token ring	Other	Coaxial	Fiber	IBM	Shielded twisted pair	Unshielded twisted pair	Other	Frame relay	T-1	X.25	Other	Alarms	Fault management	Traffic monitor	CMIP	CMOT	SNMP	Other	A = AppleTalk E = Ethernet F = Fiber T = Token ring O = Other		
Netcor, Inc.	(800) 531-1300	RMX	S	567	24	26		✓				✓	✓		✓	✓											✓		-	\$1,495	
Network Resources Corp.	(408) 263-8100	MultiGate Hub-Intelligent 10BaseT Hub	S	26	2	-		✓				✓	✓		✓	✓							✓	✓	✓			✓	E	\$2,495	
		MultiGate Hub-Intelligent 10Base2 Hub	S	14	15	-		✓					✓	✓				✓					✓	✓	✓			✓	E	\$4,995	
		MultiGate Hub-Intelligent FOIRL Fiber Optic Hub	S	14	14	-		✓					✓	✓				✓					✓	✓	✓			✓	E	\$3,395	
		MultiGate Hub2-Intelligent 10BaseT Internetworking Hub	S	28	26	2		✓					✓	✓		✓	✓	✓		✓		✓	✓	✓			✓	E	\$5,995		
NetWorth, Inc.	(800) 544-5255	Series 4000 Enterprise Command Center	C	120	5	10		✓				✓	✓			✓								✓			✓	E	\$20,000		
		Series 4000 Network Command Center	C	72	5	6		✓					✓	✓			✓							✓			✓	E	\$10,000		
		Series 4000 Department Command Center	C	36	5	3		✓					✓	✓			✓							✓			✓	E	\$6,000		
		Series 4000 Satellite Command Center	C	12	1	1		✓					✓	✓			✓							✓			✓	E	\$2,000		
North Hills, a division of Porta Systems Co.	(800) 753-4526	MAU-LAT4000	S	96	32	8				✓		✓	✓	✓	✓	✓							✓	✓					T	\$5,820	
Optical Data Systems, Inc.	(214) 234-6400	ODS 290	C	176	12	12	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	A, E, F, T	\$6,850	
		ODS 291	C	64	5	5	✓	✓	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	A, E, F, T	\$5,450	
		ODS 292	C	48	4	4	✓	✓	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	A, E, F, T	\$5,450	
		ODS 293	C	176	12	12	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	A, E, F, T	\$6,850
		ODS 295	C	176	12	12	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	A, E, F, T	\$6,850
		ODS 296	C	176	12	12	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	A, E, F, T	\$6,850
		ODS 297	C	176	12	12	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	A, E, F, T	\$6,850
		ODS 1085-4	S	4	2	-		✓								✓								✓	✓	✓	✓	✓	E, F, T	\$8,700	
		ODS 1085-6	S	6	2	-		✓						✓										✓	✓	✓	✓	✓	E, F, T	\$12,100	
		ODS 1085-8	S	8	2	-		✓						✓										✓	✓	✓	✓	✓	E, F, T	\$13,800	
		ODS 1090	C	60	2	12			✓					✓										✓	✓	✓		✓	✓	E, F, T	\$28,930
		ODS 1091	C	30	2	7			✓					✓										✓	✓	✓		✓	✓	E, F, T	\$25,290
ODS 1092	C	12	2	5			✓					✓										✓	✓	✓		✓	✓	E, F, T	\$23,160		
Penril DataComm Networks	(800) 473-6745	Series 2500	C	120	5	5		✓			✓	✓	✓			✓		✓	✓	✓	✓	✓	✓	✓		✓		E, O	\$9,750		
		Series 2000	C	96	4	4		✓			✓		✓	✓			✓						✓	✓	✓		✓		E, F, O	\$14,000	
Pivotal Technologies, Inc.	(408) 374-7887	ModularHub	S	14	-	-		✓				✓				✓												E	\$600		
		LittleHub	S	8	1	-		✓					✓				✓											E	\$400		
		MAUcard Plus	B	5	1	-		✓					✓				✓											E	\$350		
		MAUcard	B	4	1	30		✓									✓											E	\$299		
		FlexiHub	B	12	-	-		✓									✓												E	\$400	
Plexcom, Inc.	(805) 522-3333	Plexnet	C, S	224	14	14	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	E, T	\$995		
		Series 90 Intelligent Network Concentrator	C	100	10	10		✓			✓			✓	✓	✓	✓		✓	✓	✓			✓	✓	✓		✓	A, E, T	\$2,890	
Proteon, Inc.	(800) 545-7464	Series 70 Intelligent Wire Center	S	8	1	-				✓			✓	✓	✓	✓							✓	✓	✓		✓	-	\$995		
PureData, Inc.	(214) 242-2040	PDC610AI	S	10	1	0					✓	✓		✓									✓	✓	✓			✓	O	\$1,195	
		PDC610AI-T	S	10	1	0					✓					✓	✓						✓	✓	✓			✓	O	\$1,295	
Racal-Datacom, Inc.	(800) 526-8255	PremNet 5000 System	C, S	V	8	8		✓		✓			✓											✓				-	\$7,430		
		Internext	C	208	27	14		✓					✓	✓			✓		✓		✓	✓	✓	✓			✓	E	\$4,675		
Raylan Corp.	(415) 324-5000	Network Series Token-Ring Concentrator	S	16	1	10				✓		✓	✓	✓	✓	✓							✓	✓			✓	-	\$1,500		
		Network Series Ethernet Concentrator	S	16	1	10		✓		✓			✓	✓	✓	✓	✓						✓	✓			✓	-	\$1,500		
St. Clair Systems Corp.	(800) 326-5267	Clairflex/260	S	12	1	-		✓				✓	✓			✓							✓	✓	✓		✓	-	\$595		
Standard Microsystems Corp.	(800) 762-4968	SMC Coax Intelligent Hub	S	8	1	-					✓	✓											✓	✓	✓			✓	-	\$645	
		SMC Twisted Pair Hub	S	8	1	-					✓												✓	✓	✓			✓	-	\$795	
		SMC 3512TPi/Telco	S	14	1	-		✓					✓	✓			✓	✓					✓	✓	✓			✓	✓	-	\$1,695
		SMC 3512TPi	C, S	14	1	-		✓					✓	✓			✓	✓					✓	✓	✓			✓	✓	-	\$1,695
Star-Tek, Inc.	(800) 225-8528	Focus Series	C	100	5	5		✓	✓	✓	✓		✓	✓	✓	✓						✓	✓	✓		✓	✓	-	\$2,500		
Synemetics, Inc.	(508) 670-9009	LANplex 5004	C	24	24	4		✓	✓				✓			✓							✓	✓	✓		✓		E, F	\$22,900	
		LANplex 5012	C	88	V	12		✓	✓				✓				✓						✓	✓	✓		✓		E, F	\$29,900	
SynOptics Communications, Inc.	(800) 776-6895	LattisNet Model 2810 Managed 10Base-T Workgroup Concentrator	S	12	1	-		✓				✓			✓	✓							✓	✓	✓		✓	E	\$1,995		
		LattisNet Model 2914 Fiber Optic Workgroup Concentrator	S	14	2	-			✓					✓										✓	✓	✓		✓	✓	F	\$23,995
		LattisNet Model 2912 STP FDDI Workgroup Concentrator	S	14	2	-			✓						✓	✓							✓	✓	✓			✓	✓	F	\$15,500
		LattisNet Model 2800 10Base-T Workgroup Concentrator	S	12	1	-		✓					✓			✓	✓												E	\$995	
		LattisNet Model 2310 10Base-T Area Concentrator	S	36	1	-		✓					✓				✓	✓						✓	✓	✓		✓	E	\$5,495	
		LattisNet Model 3030 Department Concentrator	C	48	3	4	✓	✓		✓			✓	✓	✓	✓	✓		✓	✓	✓			✓	✓	✓		✓	E, T	\$750	
		LattisNet Model 3000 Premises Concentrator	C	144	6	12	✓	✓	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓										

Hubs (continued from page 53)

Company	Telephone	Product	Hub type	Maximum number of:			LAN types					Cabling					WAN support		Net management	Management protocols		Bridging/Routing	Starting price								
			C = Chassis B = Board S = Stand-alone	Ports	LANs (V = Varies)	Slots	AppleTalk	Ethernet	FDDI	Token ring	Other	Coaxial	Fiber	IBM	Shielded twisted pair	Unshielded twisted pair	Other	Frame relay	T-1	X.25	Other	Alarms	Fault management	Traffic monitor	CMIP	CMOT	SNMP	Other	A = AppleTalk E = Ethernet F = Fiber T = Token ring O = Other		
SynOptics (continued)		LattisNet Model 2715 SNMP-Managed Token Ring Workgroup Hub	S	16	1	-				✓					✓	✓						✓	✓	✓			✓		T	\$3,995	
3Com Corp.	(800) 638-3266	LinkBuilder 3GH	C, S	88	V	12		✓	✓				✓			✓						✓	✓	✓			✓	✓	E, F	\$30,000	
		LinkBuilder ECS/10	C	120	10	11		✓				✓	✓		✓	✓			✓	✓		✓	✓	✓	✓		✓		E	\$4,000	
		LinkBuilder ECS/4	C	48	4	4		✓				✓	✓		✓	✓			✓	✓		✓	✓	✓	✓		✓		E	\$3,000	
		LinkBuilder 10BTi	S	12	1	-	✓	✓	✓	✓	✓					✓	✓						✓	✓	✓			✓	✓	-	\$1,995
Ungermann-Bass, Inc.	(800) 777-4526	Access/One	C, S	120	11	V	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	✓	E, T, F, A	\$1,995	
Xyplex, Inc.	(800) 338-5316	MAXserver 4000 Series	C	64	5	5		✓				✓	✓		✓	✓			✓	✓	✓	✓	✓	✓			✓	✓	E	\$5,000	
		MAXserver 5000 Series	C	192	16	16		✓					✓	✓		✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	E	\$10,000	
Zenith Electronics Corp.	(800) 788-7244	Enterprise Exchange	C	180	7	36	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓	✓	✓			✓		E, T	\$990	
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SOURCE: NETWORK WORLD

manager can set alarms that will signal a potential failure before it happens.

Additionally, network management has moved down to the port level. Intelligent hubs give net managers the ability to control network configurations by enabling and disabling ports remotely.

For instance, SynOptics recently beefed up its hub management offerings when the company introduced two modules for its LattisNet Model 3000 intelligent hub.

aged centrally.

The addition of management functionality to low-end hubs is also seen as a way for firms to distinguish their products in a commodity market.

For example, in March, Dayna Communications, Inc. started shipping its new 10Base-T hub, called DaynaSTAR Hub-12.

The Hub-12 in its basic form is not an intelligent hub. However, net managers can purchase an optional DaynaSTAR SmartCard for the hub that contains an on-board SNMP agent and an RS-232 port.

Using the SmartCard, the entire hub can be managed through the RS-232 port or directly through the network.

3Com also offers SNMP management for its low-cost hubs. Included in the firm's LinkBuilder line of 10Base-T hubs is a 12-port intelligent hub that comes with SNMP management standard. The product costs less than \$2,000.

Another firm that added SNMP managed hubs to its line this year was Accton Technology Corp. The company's \$1,095 EtherHub-12i has 12 ports and can be linked with 14 other EtherHub-12i hubs to support as many as 168 users.

A management module, called EtherHub-MGT, can handle as many as 14 devices, including hubs, multiport repeaters and bridges.

The management module includes several SNMP agents and uses an RS-232 link or terminal emulation to support out-of-band SNMP management. The device can also support in-band SNMP management.

Outlook is good

The LAN wiring hub market is a hotbed of vendor activity that will likely become more crowded in the months to come. Newcomers are bound to squeeze their

way into the market with aggressively priced units or with standard features and functions offered as options by established vendors.

Likewise, as hub vendors continue their push to integrate routing and bridging functions into their products, internetworking

vendors will likely offer next-generation hubs that are a hybrid between traditional intelligent hubs and high-end bridge/routers.

And when they do, hub vendors may be ready with hubs that offer built-in LAN server functions or other features to help dif-

ferentiate the vendors' equipment from their new rivals.

The big winner appears to be the network manager who can stand by and watch the "blue light specials" unfold. □

Salamone is Network World's feature writer.

The hubs of Ernst & Young's universe

By Stuart Gavurin and Laura DeNardis
Special to Network World

Confronted with every type of local-area network imaginable, professional services provider Ernst & Young recently adopted several LAN standards that included the installation of intelligent wiring hubs across the company's U.S. offices.

According to Lee Spenadel, assistant director of national networking at Ernst & Young's National Technology Department, the company's two-step plan called for the adoption of the IEEE 10Base-T standard for running Ethernet over telephone type wiring.

In addition, Ernst & Young installed intelligent wiring hubs in 75 offices to support a vast array of multiple LAN types. The hubs also provide net managers with management capabilities that enable them to oversee the traffic, faults and configuration of every workstation on every network.

To identify the hub that would best meet the company's requirements, Ernst & Young formed a shopping list of key buying criteria.

High on that list was LAN support. The firm wanted a hub that could support the variety of Ethernet and token-ring LANs at remote sites, as well as provide the means to migrate to Fiber

Distributed Data Interface nets.

Network management was another key factor because Ernst & Young wanted to centralize remote node management. Remote management was a hot ticket item because some offices did not have a LAN administrator and such a feature would enable a central net manager to reconfigure or address problems without sending a technician to the site.

Ernst & Young also flagged maintenance support as a key factor because some remote offices did not have the trained staff to ensure a quick response to an outage or alarm.

Perhaps the greatest factor that drove the selection process was the availability of integrated internetworking components such as bridges and routers. Before implementing hubs, Ernst & Young had limited LAN internetworking capabilities.

After reviewing information from several companies, including Cabletron Systems, Inc., Fibermux Corp., SynOptics Communications, Inc. and Ungermann-Bass, Inc., Ernst & Young chose SynOptics.

Although other vendors would have adequately met Ernst & Young's general needs, the firm chose SynOptics because, among other reasons, it offered the ability to manage every port on every LAN. At the

time, SynOptics had the only product that would enable the firm to do so without having to buy more hubs than necessary.

Using intelligent wiring hubs has enabled Ernst & Young to better manage and more easily implement LANs. Specifically, the ability to perform remote net management enables personnel at the company's New York offices to monitor and control remote nodes.

This means that the main office can handle problems remotely rather than having to send technicians out to the remote sites — an important capability, since many of the company's smaller offices don't have a full-time network administrator.

Furthermore, the local offices have responded well to the hub implementation and have found that the hubs are easy to reconfigure. This is important given that the office LAN environments are constantly changing and growing.

"[By using hubs] we've created an environment whereby the end users can reconfigure and easily manage their networks on a day-to-day basis and as needs change," Spenadel says.

Gavurin is a manager and DeNardis is a senior consultant with Ernst & Young in Vienna, Va.

Now — due to user demand — many vendors offer low-end hubs with net management as an option.



The new modules, called the Model 3313 and 3314, employ an SNMP agent to allow for easier management and control.

The modules are designed to capture, analyze and display a wide range of statistics on network errors and events. Each module can evaluate 288 different parameters, each of which can be set by the network manager.

Net management has been a feature of high-end hubs, but now — due to user demand — many vendors offer low-end hubs with net management as an option. This additional management capability of the low-end hubs allows these products to be man-

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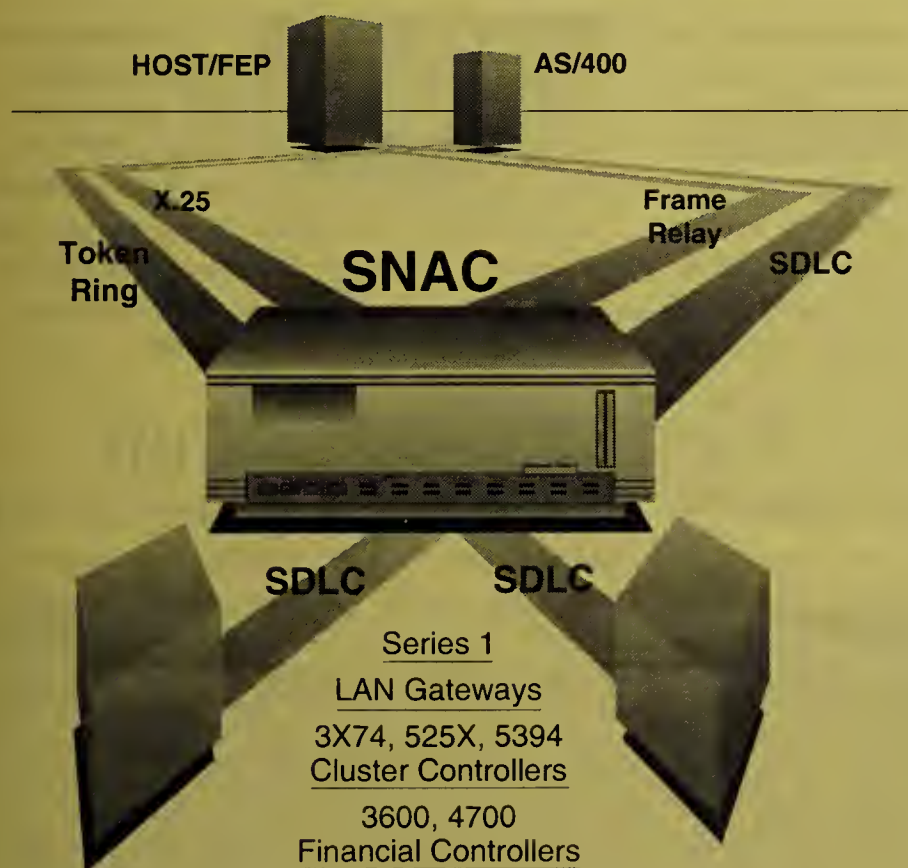
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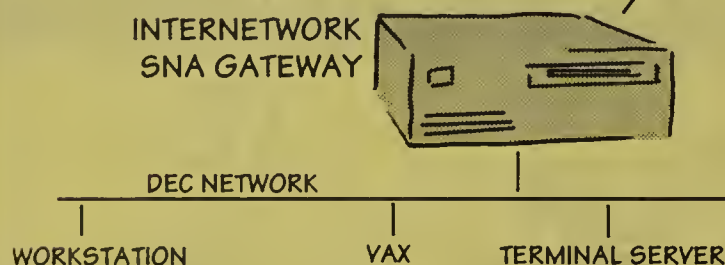
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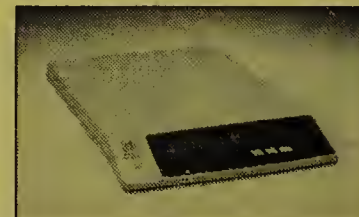
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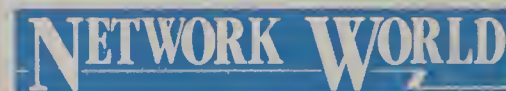


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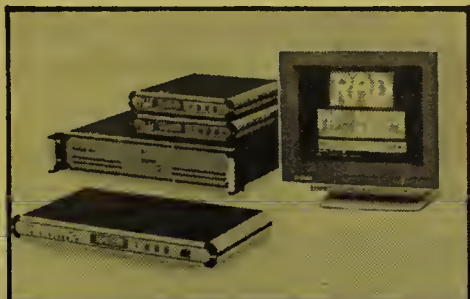
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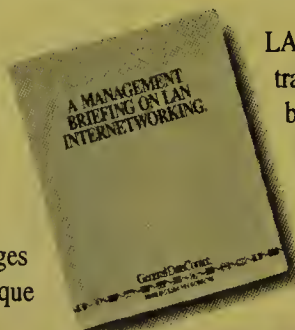


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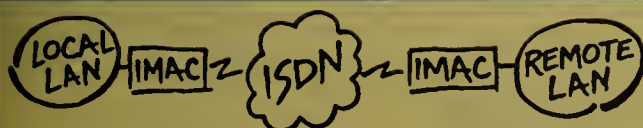
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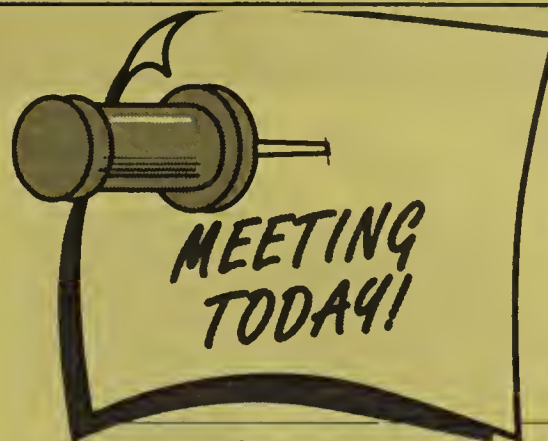
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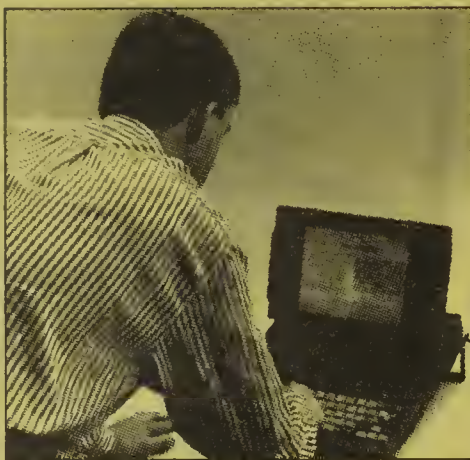
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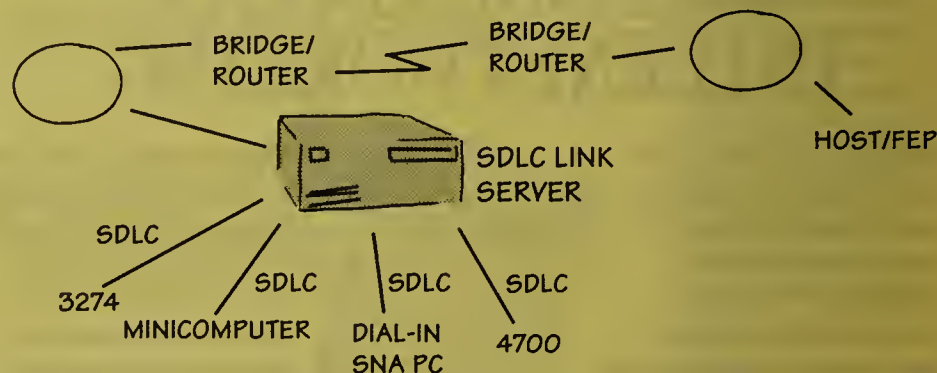
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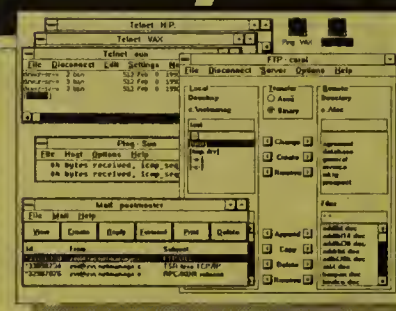
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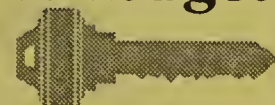
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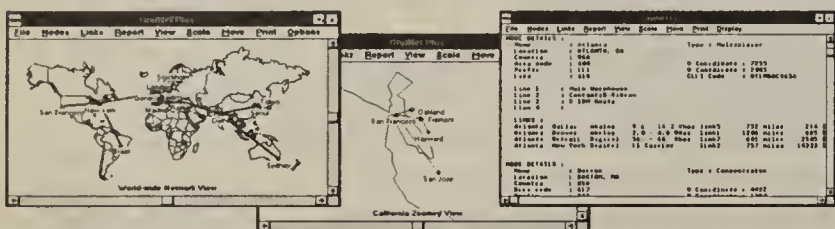
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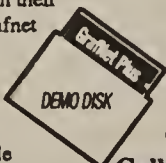
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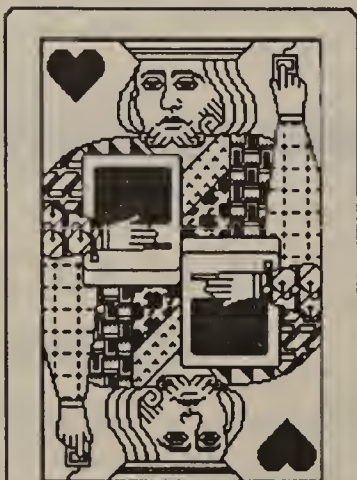
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Every week, *Network World* provides information that helps users who design, purchase and implement enterprise networks.

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- * Telecommunications
- * Data Communications
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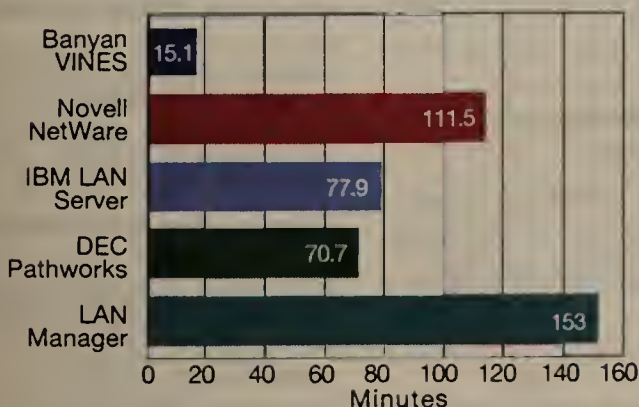
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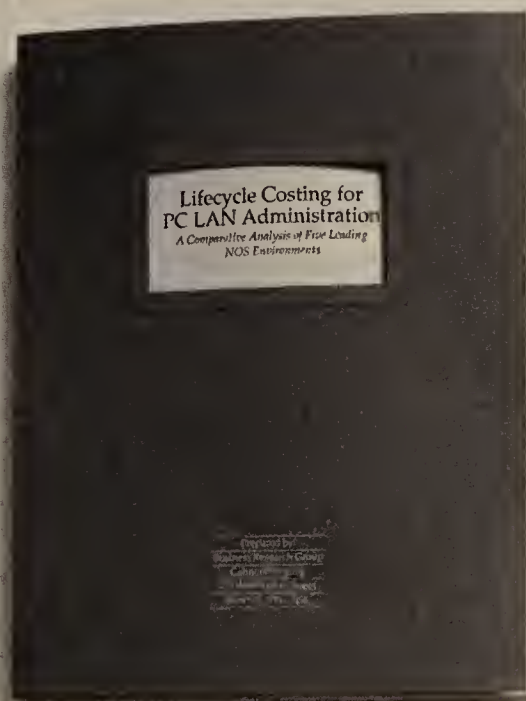


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RELEASE 1.0

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CONFERENCE SCHEDULE

GENERAL SESSIONS

Monday, August 3, 1992

■ Welcome to GroupWare '92

David Coleman, Conference Chairman
Monday, 8:00 am - 8:15 am

■ Keynote Presentation: Jim Manzi, President and CEO, Lotus Development Corporation

"Groupware: Delivering on the Productivity Promise"

Does anyone know what groupware is? Does anyone care? Can groupware—whatever it is—deliver real, tangible gains in organizational productivity?

Monday, 8:15 am - 9:00 am

■ Esther Dyson, Editor and Publisher, Release 1.0

"A Framework for Groupware"

Esther Dyson provides a framework for classifying groupware tools and applications based on the following: does it manage the work; does it manage the content of the work; where is the center of control and technically, is it mail-based, data-base-based or object-based? This classification is important to determine a system and software's suitability for a given set of tasks or corporate culture.

Monday, 9:00 am - 9:45 am

■ Susanna Oppen, Susanna Oppen and Associates

"TECHNOLOGY FOR TEAMS: Enhancing Productivity and Gaining Competitive Advantage"

There is a lot of discussion about productivity, quality, and regaining competitive advantage. Groupware proponents suggest workgroup technology can bring these benefits to organizations. But where is the hard evidence of groupware's payoff?

Monday, 10:15 am - 11:00 am

■ Sheldon Laube, National Director of Information and Technologies, Price Waterhouse

"Leading the Charge: From 0 to 10,000 Notes Users in 24 Months"

The deployment of 10,000 copies of Lotus Notes has caused some fundamental changes at Price Waterhouse. This talk will discuss issues involved in the selection, implementation, and support of one of the world's largest groupware implementations.

Monday, 11:00 am - 11:45 am

■ Lunch Presentation: Dr. Thomas Malone, MIT; sponsored by DEC

"Information Technology and Coordination: How Will The Organization Change?"

With groupware and other new technologies, people and companies are becoming increasingly interconnected and interdependent. How can we use these new technologies to organize ourselves more productively? What new organizational forms will emerge? Most importantly, what kind of world do we want to create?

Monday, 12:00 pm - 1:00 pm

Tuesday August 4, 1992

■ Ray Noorda, President and CEO, Novell, Inc.

"The Past, Present, and Future of Network Computing"

Ray Noorda runs Novell with some very unconventional business wisdom. Chief among these ideas is the concept that cooperation is more profitable than competition. Some of the questions he asks are: How do computer users influence vendors to work together on behalf of customers? How can users make their needs understood by the companies who supply them with computing solutions? Is there evidence that cooperation can truly be more profitable than competition?

Tuesday, 8:00 am - 8:45 am

■ Ronald J. Whittier, V.P. Software Technology, Intel Corporation

"Supplying The Right Stuff For Groupware"

During the '80s, PC hardware and software solutions brought revolutionary personal productivity improvements. The challenge of the '90s is to unlock the PC's potential by harnessing its raw power to software that enables collaborative (workgroup) computing. Mr. Whittier will discuss Intel's existing and emerging technologies that support groupware.

Tuesday, 8:45 am - 9:30 am

■ David L. Stone, V.P., Digital Equipment Corporation

"Groupware In The Global Enterprise"

Collaborative work environments foster a compelling vision of productive teams in a rapidly changing, information-intensive world. DEC has used groupware technologies to support its global engineering efforts for nearly a decade. Mr. Stone will let us know what DEC has learned from this experience as well as taking a look at the technology and environmental needs for future collaborative programs.

Tuesday, 9:30 am - 10:15 am

■ Carl DiPietro, V.P. Human Resources, Marriott Corporation

"Groupware Meetings That Work"

Mr. DiPietro will talk about the now successful Marriott Group Decision Center. This center and its meeting groupware has been used by over 2000 employees and 30 com-

panies to resolve business issues faster and more productively.

Tuesday, 10:45 am - 11:30 am

■ General Session Panel: Ronni Marshak, The Patricia Seybold Group (Moderator); Marcello Hoffman, SRI; Paul Saffa, Institute for the Future; Bill Higgs, InfoCorp

"Groupware Market Research Roundtable"

The groupware market is just now being defined, and there are many questions that need to be raised: Where will the groupware market be in 1995? Can groupware be sold through traditional distribution channels? Does groupware truly raise productivity? Who exactly will buy groupware applications and support them?

Tuesday, 11:30 am - 12:30 pm

■ Lunch Presentation: David L. Connor, Vice President, Lotus Consulting Services Group; sponsored by Lotus

"New Technologies to Support Organizational Change"

A large number of converging trends such as downsizing, workgroup computing, re-engineering, and client-server architectures have increased the pace at which companies must respond in an increasingly competitive business environment. These demands are only manageable with new and emerging technologies. This presentation will discuss key strategies and tactics for implementing these technologies based on specific experiences of several large clients of Lotus.

Tuesday, 12:30 pm - 1:30 pm

Wednesday, August 5, 1992

■ Philippe Kahn, President and CEO, Borland International

"The Changing Dynamics of Workgroup Computing"

Philippe Kahn will present an overview of Borland's strategy for workgroup computing and the evolution of this important new category.

Wednesday, 8:00 am - 8:45 am

SPECIAL EVENT BEST OF SHOW AWARDS

Sponsored by Intel

On Tuesday evening, Intel will host a party for all exhibitors and attendees featuring the first "GroupWare '92 Best of Show Awards." This event will include a formal sit-down dinner with entertainment and an awards presentation by key industry spokespeople. This contest is open to all exhibitors of GroupWare '92, and exhibitors may enter products in one of eight award categories.

Tuesday, 6:30 pm - 10:30 pm

■ Dr. Terry Winograd, Stanford University

"Groupware in Action"

Dr. Winograd will describe the current groupware products that provide explicit support for coordination and will point to new directions that we can expect to see in the future.

Wednesday, 8:45 am - 9:30 am

■ Dr. Jael N. Orr, Chairman and Principal Consultant, Orr Associates, Inc.

"Graphics and Groupware: Increasing Intimacy through Broadening Bandwidth"

Pictorial communications are approximately 50,000 times as dense as verbal exchanges and, for that reason alone must figure centrally in groupware support. Intimacy is the goal. Graphics will help us get there.

Wednesday, 9:45 am - 10:30 am

■ Dr. Douglas Engelbart, The Bootstrap Institute

"Toward High-Performance Organizations: A Strategic Role for Groupware"

Achieving tomorrow's high-performance organizations will involve massive changes throughout their capability infrastructures. Groupware will support important, special new knowledge capabilities in these infrastructures and also can play a key role in an evolutionary strategy.

Wednesday, 10:30 am - 11:15 am

■ Daniel Petre, General Manager, Workgroup Applications Division, Microsoft Corporation

"Groupware Evaluation, Not Revolution"

Can the promise of "groupware" be realized without rebuilding your entire computing infrastructure? Daniel Petre presents Microsoft's vision of workgroup computing, practical advice on selecting groupware partners, and a strategy for leveraging your existing investments on the road to collaborative computing.

Wednesday, 11:15 am - 12:00 pm

TRACK 1: Management & Cultural Issues

■ Groupware Cultural Issues Panel

William Ryan, Susanna Oppen and Associates (Chairperson); Peter Olson, MCI; Donald Coleman, Ventana Corporation; Robert Johnson, Computer Associates; Peter and Trudy Johnson-Lenz, Awakening Technology

Monday, 2:00 pm - 2:45 pm

■ Capturing Organizational Memory

Jeff Conklin, Corporate Memory Systems, Inc.

Monday, 3:00 pm - 3:45 pm

■ GroupWare and Telecommuting in the 1990s

J. Robert Martinson, Futurus (Chairperson); Thomas Cross, Cross Communications Company; Mark Stiegler, AMIX

Monday, 4:30 pm - 5:15 pm

■ Issues In Workflow Management Panel

Ann Palermo, IDC (Chairperson); James H. Bair, Competition Technologies Corporation; Raul Medina-Mora, Action Technologies; Geoffrey Back, Digital Equipment Corporation

Tuesday, 2:00 pm - 2:45 pm

■ Groupware: Bureaucracy Buster

Dr. Peter Dolan, VFD Consulting, Inc.

Tuesday, 3:00 pm - 3:45 pm

■ Groupware Security Design Objectives

Charles Cresson-Wood, Information Integrity

Tuesday, 4:30 pm - 5:15 pm

TRACK 2: Technology & Groupware Development

■ Groupware Human Interface Issues Panel

Dr. Robert Johansen, IFTF (Chairperson); Dr. Catherine Beise, AIRMICS

Monday, 2:00 pm - 2:45 pm

■ Glueware Panel

Timothy O'Brien, Network World (Chairperson); Ehud Shapiro, Weizmann Institute; Dorab Patel, Twin Sun; Scott McGregor, Present, Inc.

Monday, 3:00 pm - 3:45 pm

■ Groupware Services Panel

Dennis Allison, HAL (Chairperson); Bill Larson, SunSoft; Richard LaValley, MCI; Chris Allen, Consensus Development

Monday, 4:30 pm - 5:30 pm

■ Groupware Architectures Debate

Esther Dyson, EDventure Holdings (Moderator); John Londry, Senior Vice President and Chief Technology Officer, Lotus; Richard Schwartz, Senior V.P. and Chief Technology Officer, Borland

Tuesday, 2:00 pm - 2:45 pm

■ Database/Data Access Issues for Groupware Panel

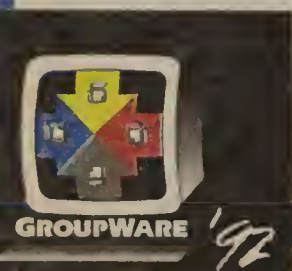
Richard Schwartz, Borland (Chairperson); Cliff Reid, Verity; Mark Benioff, Oracle; Bruce Duff, IDI

Tuesday, 3:00 pm - 3:45 pm

■ Groupware In the Enterprise: Standards, Communication, and Integration

Mitch Shults, Intel (Chairperson); Dr. Julie Kling, Peer Logic; Mark Stiegler, Xanadu; Richard Vincent, Configrex, Inc.

Tuesday, 4:30 pm - 5:15 pm



TRACK 3: Groupware in the Commercial Marketplace

Electronic Mail Products Panel

Nina Burns, Network Marketing Solutions International (Chairperson); Audrey Augun, Digital Equipment Corporation; J. Robert Martinson, Futurus, Inc.; Charles Digate, Beyond, Inc.; John Rizzi, Network, Inc. Monday, 2:00 pm - 2:45 pm

Workflow Products Panel

Rannie Marshak, The Patricia Seybold Group (Chairperson); Jordan Libett, FileNet; Ken Einstein, Barland International; Anand Jagannathan, Reach Technologies; Dean Cruse, Plexus Monday, 3:00 pm - 3:45 pm

Focus on Lotus Notes Panel

Sheldon Laube, Price Waterhouse (Chairperson); Ken Norland, DSSI; Charles Grantham, Grantham and Nichols; Michael Goulde, The Patricia Seybold Group Monday, 4:30 pm - 5:15 pm

Groupware for Document Management Panel (special 2-hour session)

George Rossman, X-Soft (Chairperson); Pat Marriott, Adobe; Stephen Cankling, Kodak; Darlene Mann, Verity; Alvin Tediamulia, SoftSolutions; Ken Santora, Inventa Corp. Tuesday, 2:00 pm - 3:45 pm

Groupware for Decision Support Panel

Jay Nunamaker, Ventana (Chairperson); David Friend, Pilot; Nelson Hazeltine, NCR; Dr. Arnie Urken, SmartChoice Technologies Tuesday, 4:30 pm - 5:15 pm

TRACK 4: Combination Track

Groupware Licensing, Pricing, and Distribution Panel (special 2-hour session)

David Coleman, Groupware '92 Conference Chairman (Chairperson); Lindy Brandt, Digital Equipment Corporation; Kevin Brown, Corporate Software; Fritz Dresler, Actian Technologies; John Halliwell, Ziff-Davis Publishing; Al Stoddard, Lotus Monday, 2:00 pm - 3:45 pm

Group Scheduling - The Next Big Workgroup Application? (panel)

Canall Ryan, ON technology, Inc. (Chairperson); Alex Knight, Apple Computer, Inc.; Eldon Greenwood, WordPerfect Corporation; Don Campbell, Campbell Services Monday, 4:30 pm - 5:30 pm

Messaging and Mail-Enabled Applications for the Workgroup Panel (special 2-hour session)

Mark Smith, Intel (Chairperson); Rick Segal, Microsoft; Ken Einstein, Barland; Mike Cavanagh, EMA Tuesday, 2:00 pm - 3:45 pm

Commercial Multimedia Groupware Panel

Earl Craighill, SRI (Chairperson); John R. Busch, Clarity Software; Sidhir Ahuja, AT&T Bell Labs; David Gedy, Sun Microsystems Labs; Venkat Rangan, UCSD Multimedia Lab; Terry Crowley, BBN Labs Tuesday, 4:30 pm - 5:15 pm

TRACK 5: User Experience Talks

User Experience Talk: Groupware in a Law Office: A User's Experiences

Steve Wacker, Lane, Powell, Spears, Lubersky Monday, 2:00 pm - 2:30 pm

User Experience Talk: Electronic Group Calendaring: Experiences and Expectations

Beth Lange, Andersen Consulting Monday, 2:30 pm - 3:00 pm

User Experience Talk: Conference Access Control in DCS

Dr. R.E. Newman-Walfe, University of Florida Monday, 3:00 pm - 3:30 pm

User Experience Talk: Experiences in Groupware - Benefits and Limitations in a Real-World Context

Dr. James Gantt, AIRMICS Monday, 3:30 pm - 4:00 pm

User Experience Talk: How to Select and Implement a Groupware System: The Ultimate Management Tool for the '90s

E. Huntington, SDD Monday, 4:30 pm - 5:00 pm

User Experience Talk: Groupware and Quality Management: Teamwork in Action

Andrew K. Jeffrey, QDM Monday, 5:00 pm - 5:30 pm

User Experience Talk: Meeting the Software Support Challenge with Groupware Technologies

Louise Kirkbride, Answer Computer, Inc. Tuesday, 2:00 pm - 2:30 pm

User Experience Talk: The Role in Utilizing Groupware for Business

Dr. Douglas MacIntosh, BP America Tuesday, 2:30 pm - 3:00 pm

User Experience Talk: Groupware in Investment Banking: Improving Revenue and Deal Flow

Jeffrey Held, Ernst & Young Tuesday, 3:00 pm - 3:30 pm

User Experience Talk: Electronic Collaborations in a Multi-Campus Network

Dr. John P. Witherspoon, San Diego State University Tuesday, 3:30 pm - 4:00 pm

User Experience Talk: TBD

Tuesday, 4:30 pm - 5:00 pm

User Experience Talk: Look Ma, No Prototype

Dr. Douglas Vogel, Ventana; Brad Past, Boeing Tuesday, 5:00 pm - 5:30 pm

TRACK 6: Special Sessions

Special Session: End User Multimedia and Integrated Messaging Trends

Judith Rosall, IDC Monday, 2:00 pm - 2:45 pm

Special Session: Workgroup Applications from the Network Point of View

Ed Harnish, Banyan Systems Monday, 3:00 pm - 3:45 pm

Special Session: Bringing the Meeting to the Group with a Portable Wireless LAN for Groupware

Dr. Catherine Beise, AIRMICS Monday, 4:30 pm - 5:30 pm

Special Session: Success with Notes Applications

Mark Wozny, Compaq Computer Corporation; Don Evans, Bullivant, Hauser, Bailey, Pendergrass and Hoffman Tuesday, 2:00 pm - 3:00 pm

Special Session: Workgroup Productivity - A Spreadsheet Perspective

Dr. Irene Greif, Director of Workgroup Technologies, Lotus Development Corporation Tuesday, 3:00 pm - 4:00 pm

Special Session: Intelligent Agents in Groupware

Jon Ramer, ELF Technologies Tuesday, 4:30 pm - 5:30 pm

USER GROUP MEETINGS:
Monday, 7:00 pm - 11:00 pm

TUTORIAL DAY Sunday, August 2

Computer-Supported Meeting Rooms

Lisa Neal, EDS Center for Advanced Research
Computer-supported meeting rooms increase meeting efficiency and effectiveness. This tutorial will present an overview of computer-supported meeting rooms. Lisa Neal is a Senior Research Engineer at the EDS Center for Advanced Research in Cambridge, where she leads a strategic planning project.
Sunday, 8:00 am - 11:45 am

Groupware: What Is It and What Can It Do?

Srivats Sampath, SoftPrism, Inc.
Groupware is the next emerging application domain in network computing. This tutorial will define groupware while articulating the problem sets that can be solved by a wide variety of groupware products.
Sunday, 8:00 am - 11:45 am

Developing Messaging-Enabled Applications with Microsoft Messaging API (MAPI)

Susan Fine, MAPI Product Manager, Microsoft Corporation
This tutorial is designed for information systems professionals and software developers who are interested in harnessing the power of MAPI to develop transport-independent, messaging-enabled applications. The session will provide a conceptual introduction to MAPI, a detailed walkthrough of the API, and ideas for how to use MAPI to satisfy customers' messaging needs. All attendees of the tutorial will receive a copy of the MAPI Software Developer's Kit so they can begin developing their messaging-enabled applications.
Sunday, 8:00 am - 11:45 am

Adding Intelligent Agents to Groupware Applications

Jon Ramer, ELF Technologies, Inc.
This tutorial will include a review of the current methods and approaches for the development and integration of Intelligent Agents and is recommended for developers of groupware applications and information systems managers.
Sunday, 8:00 am - 11:45 am

Making Your Notes Deployment Team a Winning Team

George J. Goldsmith, President, The Human Interface Group
This session will provide participants with a framework and skills to dramatically improve the success of their Notes implementation projects. Topics addressed: building a Notes deployment team; identifying the initial project; introducing development methodologies; implementing the benefits of Notes.
Sunday, 8:00 pm - 11:45 pm

GroupWorks - An Architecture for Groupware

Nancy Hollen Black, GroupWorks, Inc.
This tutorial focuses on re-engineering business process design through GroupWorks, which maps and manages business information systems based on the concept of the workgroup model. This tutorial is ideal for any user or manager analyzing, designing, justifying, and implementing groupware solutions.
Sunday, 8:00 am - 11:45 am

Lunch: 12 pm - 1 pm

Key Factors in Successful Deployment of Group Decision Support Systems

Lisa Ambrose, Southern New England Telephone; Christopher McGaff, GDSS
This tutorial is intended for managers, practitioners and researchers who want to better understand how to effectively apply collaborative technology applications to real life business processes. Ms. Ambrose and Mr. McGaff have facilitated over 550 corporate planning sessions for over 6000 participants and will draw both data and examples from their vast experience with TeamKit/2, TeamFocus and GroupSystems.
Sunday, 1:00 am - 4:45 am

Groupware: Software for Computer-Supported Collaborative Work

David Marca and Geoffrey Back, Digital Equipment Corporation
This tutorial introduces groupware concepts such as: collaboration and coordination across time and distance, social and organizational dimensions of groupware, enabling technologies, and perspectives for understanding and evaluating this exciting new technology. This tutorial is designed for groupware developers, users, and managers dealing with workgroup challenges. David Marca and Geoffrey Back are in Office Systems Applications Group at Digital.
Sunday, 1:00 pm - 4:45 pm

Special Double Mini-Tutorial

This tutorial combines the best of both worlds. It is composed of two 90-minute mini-tutorials that focus on productivity processes that can be used or facilitated with groupware.
Sunday, 1:00 pm - 4:45 pm

Port 1: How to Achieve Superior Results Using Groupware

Inez Hill, APLAN Information Services, Inc.
This mini-tutorial focuses on the prerequisites critical to the groupware infrastructure. Some of the topics to be discussed include: deliverables, structure, format, and human factors. This tutorial is recommended for systems integrators, developers, strategic planners, and managers with responsibility for corporate-wide challenges. Attendees will receive tutorial presentation information, exercises, and reference materials. Inez Hill is the President, Founder and CEO of APLAN Information Services, Inc.
Sunday, 1:00 pm - 2:30 pm

Port 2: Collaborating in a Competitive Environment

Bernie DeKoven, The Institute for Better Meetings
Mr. DeKoven will use special software for determining a list of strategies for collaborating in a competitive environment. The results of this discussion will be made available to all the tutorial participants. This tutorial is recommended for managers of computer-supported teams and developers of team-supported products.
Sunday, 2:45 pm - 4:45 pm

WELCOME RECEPTION GROUPWARE '92 EXHIBIT HALL Sunday 5-8 pm

Tutorial for Lotus Notes: Application Development

Amy Finn, Consulting Department, Lotus Development Corporation
This tutorial provides students with a basic understanding of how to create a Notes application. It is designed for applications developers and other professionals who will create and maintain Notes. Upon completion of this tutorial, you should be able to decide when Notes is an appropriate application development platform, be able to apply basic concepts of Notes database design, and to implement and maintain Notes. Attendees should be familiar with using Lotus Notes, DOS, Microsoft Windows or OS/2 Presentation Manager.
Sunday, 1:00 pm - 4:45 pm

Applying Film Craft to Groupware GUIs

Dr. Chuck Clanton and Emilie Young, Arator Company
The goal of this tutorial is to teach attendees to apply knowledge from film and animation to groupware user interface design. A 100-page workbook of notes is provided to each tutorial attendee and video-taped examples of interfaces will be used by the instructors. This tutorial is recommended for developers, designers and evaluators of groupware products and applications. Dr. Chuck Clanton and Emilie Young are consultants on designs for GUIs.
Sunday, 1:00 pm - 4:45 pm

An Introduction to Workflow: Technology, Process & Productivity

James H. Bair, Competition Technologies Corporation and Dr. Bonnie Johnson
This workshop will introduce you to workflow technology, process re-engineering, and productivity improvement methods. We will examine image scanning, storage and management and review re-engineering methods for increasing quality and competitiveness. Jim Bair has had over 20 years experience in the computer business and has worked with SRI, Bell Northern Research, Hewlett Packard and Xerox.
Sunday, 1:00 pm - 4:45 pm

FEATURED EXHIBITORS

APLAN Information Services
Beyond, Inc.
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Bastan Notes User Group
CHRONOS Software
CIO Magazine
Collaborative Technologies
Compaq
Corporate Memory Systems
Data Based Advisor
Digital Equipment Corp
ELAN Software
Fisher Idea Systems
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Service a sore point

continued from page 1

mote diagnostic centers and improved hot line services.

"Routing is a wonderful technology with numerous advantages, but no router will do me much good if I can't get it to work," said Randy Cosby, network manager at Texas Children's Hospital in Houston.

Cosby last year evaluated a spate of vendor wares when looking to add two new buildings to an existing campus network. He said service and support were pivotal concerns and virtually all vendors came up short. "Most of the vendors did not have a local service group and could not provide us with an on-site systems engineer to help us build the network. I finally chose 3Com [Corp.] primarily because they had a local service arm and could give us solid support," Cosby said.

According to James Herman, a principal with Northeast Consulting Resources, Inc. in Boston, internetworking technologies are the most troublesome to install and manage today. "Internetwork troubleshooting is notori-

ously difficult. Almost everything that goes wrong with an internet requires a highly trained technician — an engineering guru — to do the diagnosis," Herman said.

Users largely rely on vendors for that work; however, with the explosive demand for their products, vendors have had a hard

onus is on them to develop highly trained technical support staffs. Nearly all the leading vendors — including Cisco Systems, Inc., Proteon, Inc., 3Com Corp. and Wellfleet Communications, Inc. — said they are improving service and support by adding more remote diagnostic centers, im-

branches throughout the country that will be tied into the corporate technical support center. Additionally, by early next year the company will add at least 80 technical support specialists to the 70 it already has.

"We're investing heavily in support and plan to have a Wellfleet engineer at each customer site throughout the internetwork planning, implementation and installation phases," said Gary Geaslen, Wellfleet's new vice-president of customer support.

While they may not be defining the cutting edge of internetwork technology, large system vendors like IBM may win over customers concerned about service.

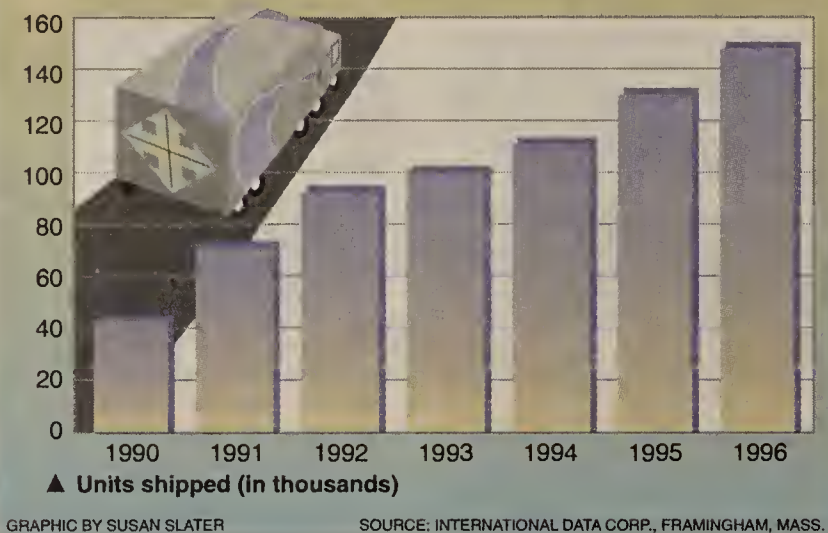
The Travelers Corp., based in Hartford, Conn., is in the process of building a router-based internet. Steve Simon, the company's engineering project manager, said he is leaning toward IBM, with its giant support staff, for bridge/router gear because downtime on an internet supporting mission-critical applications would be unacceptable.

"I'm not at all convinced that the traditional router vendors are capable of providing the support we need," he said.

But analysts warned that a larger staff does not always translate into superior service.

"IBM has a greater number of resources on hand, but the strength of the traditional router vendors is that they really understand the technology," said Jeff Kaplan, a director at Ledgeway/Dataquest, a Framingham Mass.-based market research firm. "All vendors need to staff themselves with technicians who thoroughly understand how to troubleshoot a complex internetwork." □

Estimated worldwide bridge/router shipments



time keeping up with service demands (see graphic, this page).

According to Susan Frankle, a senior analyst at International Data Corp., a market research company in Framingham, Mass., bridge/router vendors used to sell mostly into technical markets where users were more sophisticated. But as they expand further into the commercial realm they are dealing with different needs.

"Router vendors grew up selling to technology-oriented users who didn't mind tweaking the router to make it function properly. But the typical commercial user doesn't want to fool around with the technology; they just want it to work," Frankle said.

Internet vendors agree the

proving help desk capabilities and beefing up hot line services.

John Morgridge, president and chief executive officer of Cisco, said his company is devoting significantly more resources this year to internal training programs and hiring highly specialized engineers.

"Service is certainly the area of greatest challenge for Cisco today," Morgridge said. "A technical specialist needs to know Unix, Apple, Novell, Apollo Domain, Banyan and, increasingly, SNA. In addition, corporate internets are becoming larger and more geographically dispersed, all of which adds to the complexity."

Rival Wellfleet also plans to boost service during the next year by setting up more field service

Novell to resell Gupta products

continued from page 2

ter Research, Inc., a research firm based in Cambridge, Mass. "This will accelerate Novell's role in the client/server market.

"Gupta's up against Sybase and Oracle — and those are big companies. This gives them a new level of visibility and validation," Woodring said.

The right thing

For customers of Gupta, which is 19% owned by Novell, the Novell deal is an endorsement of their buying decisions.

"I don't need an agreement like this to legitimize the client/server architecture. I know it's the right thing for us. What it does is legitimize our choice of vendors," said Dale Kasperek, court administrator at the Stark County Court of Common Pleas in Stark County, Ohio.

However, some observers

questioned whether the deal could cause confusion, as Gupta's database server could be seen as competing with Novell's NetWare SQL database. But Novell stressed that the products appeal to different audiences.

"NetWare SQL provides relational SQL access to Btrieve data and that's pretty much it," said Robert Shoop, director of Novell's database products division in Austin, Texas, referring to Novell's own flat-file Btrieve database. NetWare SQL appeals to customers running low-end applications that simply need SQL access to a Btrieve database.

"Gupta's SQLBase engine is a high-performance engine that's been clocked at over 100 transactions per second," Shoop added.

The Gupta products would likely be used by customers to support transaction-oriented ap-

plications. These customers would probably also be interested in the Windows development tools and host-database connectivity provided by Gupta.

Although this is Novell's first such distribution agreement with a software vendor, analysts said it is no surprise.

"This is just another piece in Novell's puzzle to become a complete solutions provider," said Hugh Bishop, software analyst at Aberdeen Group, Inc., a research and consulting house based in Boston. "Novell will likely add more companies to this list as time continues."

Other analysts pointed out that Novell stands to gain even more considering its stake in Gupta.

"If you owned a company and someone found out that your brother handles all the trucking and freight, would that be a big surprise? I don't think so," Woodring said. □

NETWORK WORLD

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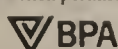
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IN A NUTSHELL



APIs act as mediators in user nets

Developers use API specs to build communications transparency into applications.

Whoever devised the concept of application program interfaces (API) must have been a labor mediator in a prior life. APIs are becoming the primary means of spanning the differences between applications and services.

The purpose of an API is to allow software programs from different manufacturers to understand how to communicate with one another. In the purest sense, an API is a set of specifications defining common commands — such as send, receive and error — and possibly defining file types to be sent or received.

APIs, however, do not alter data files. Therefore, they do not resolve data file differences such as converting a WordStar International, Inc. WordStar file to Microsoft Corp.'s Word or WordPerfect Corp.'s WordPerfect format. But APIs do provide the common interface that allows for the data file transfer.

In single operating system en-

vironments, APIs are quite different depending on how the nets are interconnected.

For this reason, two groups of network API standards have emerged — one for local-area nets and one for wide-area nets.

LAN vs. WAN

APIs between an application, such as a word processing program, and the network operating system allow the application to communicate across the LAN.

IBM's Network Basic I/O System and Named Pipes are common APIs used in DOS environments to allow applications to communicate across LANs. Both provide the session-layer interface between the communicating applications at each end of the LAN and the LAN itself. The LAN provides services from the physical through transport layer.

These LAN APIs have been very important to the proliferation of LANs. By virtue of LAN APIs, independent application software developers can provide new and unique applications that are compatible with each network operating environment.

While standards bodies have left the definition of LAN APIs to vendors, the Consultative Committee for Interna-

tional Telephony and Telegraphy is in the process of developing formal standards for WAN APIs.

But the CCITT prefers to use the term "programming communications interface" (PCI) rather than API. The CCITT's PCI model (see graphic, this page) defines two interfaces: the Applications-to-Communications interface (Appli/Com) and the Communications-to-Protocol interface (Com/Protocol).

When it becomes available,

Appli/Com will allow applications such as word processing programs to access communications applications (CA) that support one or more WAN services. The Appli/Com interface is built into the end-user application, such as a word processor or spreadsheet. The CA software provides a mating interface to the end-user application.

The CA software may be located in the same system as the end-user application when a single computer is used or it may be located across a LAN.

When the end-user application is located on one computer on a LAN and the CA on another, the communications capabilities of the LAN carry the messages between the two Appli/Com interfaces. Because of the delays possible when messages are passed across a LAN, the Appli/Com interface is not a real-time interface. Instead, it supports client/server communications.

The lower level API, called Com/Protocol, is the standard for connecting the CA and the Lower Layer Module (LLM) software controlling the data communications equipment (DCE). The LLM operates at a similar layer for WANs as the NETBIOS interface does for LANs. There is a specific Com/Protocol interface for each communications service such as Group III facsimile, modems, X.25 or Integrated Services Digital Network.

The LLM software must be located with the DCE because it exerts real-time control over the equipment. The Com/Protocol interface is a real-time interface independent of Appli/Com. Thus, one API may be implemented without the other. Applica-

tions requiring real-time communications can use the Com/Protocol interface if they do not need to support other communications services.

The Appli/Com interface is the only interface the end-user software needs for compatibility with different communications services, such as ISDN and the public switched telephone network. The Com/Protocol interface is the only interface that each type of DCE needs to support.

CA software vendors can provide the software that connects the two interfaces. The CA software can support all existing applications, system configurations and operating system environments. In the future, new CAs will provide the ability to automatically select between different communications services for lowest cost or quickest message transfer.

This two-layer approach eliminates the requirement for each application and DCE to be modified, depending on the exact operation required. Take, for instance, an application designed to send a file over a LAN.

In order for such an application to send the file over a dial-up connection, it would have to be modified to allow for the possibility of a busy line and the need to retransmit the message at a later date. Conversely, the DCE would need a larger buffer to store the message for retransmission. PCIs eliminate the need for the software application developer to consider such issues.

Standards status

The U.S. technical committee associated with facsimile, Telecommunications Industries Association TR-29, has supported and contributed to the PCI work for almost two years. Last month, it voted to approve the T.611 Recommendation, which defines Appli/Com for use by facsimile services.

CCITT Study Groups I and VIII began working on standards for WAN APIs about two years ago.

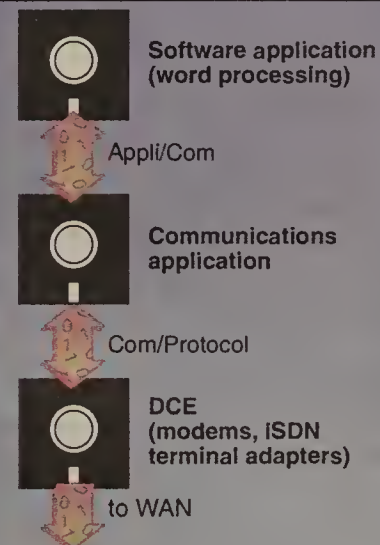
Today, Recommendation F.581 from Study Group I describes the PCI model, and Recommendation T.611 from Study Group VIII defines the initial Appli/Com interface as used for fax services. Final approval of these recommendations is expected before September.

Companies are already developing applications that support T.611. In the U.S., commercial support is developing for T.611 from companies such as Intel Corp.

CCITT Study Group VIII is beginning work on standards for the Com/Protocol interface, and the U.S. technical committee TR-29 has also begun to consider how the Com/Protocol interface will be used in the U.S.

It will be several years before the potential benefits of WAN APIs are available to users and

The CCITT's PCI model



The CCITT defines 2 levels of WAN application program interfaces, which it calls programming communications interfaces (PCI). The upper level PCI, Applications-to-Communications interface (Appli/Com), handles communication between a software package and the communications software. The lower level PCI, Communications-to-Protocol interface (Com/Protocol), handles communication between the communications software and the data communications equipment (DCE).

SOURCE: ACTION CONSULTING, PALO ALTO, CALIF.
GRAPHIC BY SUSAN SLATER

The CCITT is in the process of developing formal standards for WAN APIs.



vironments, APIs defined by the operating system — for example, Basic I/O System, which is defined in DOS — are sufficient for establishing these connections.

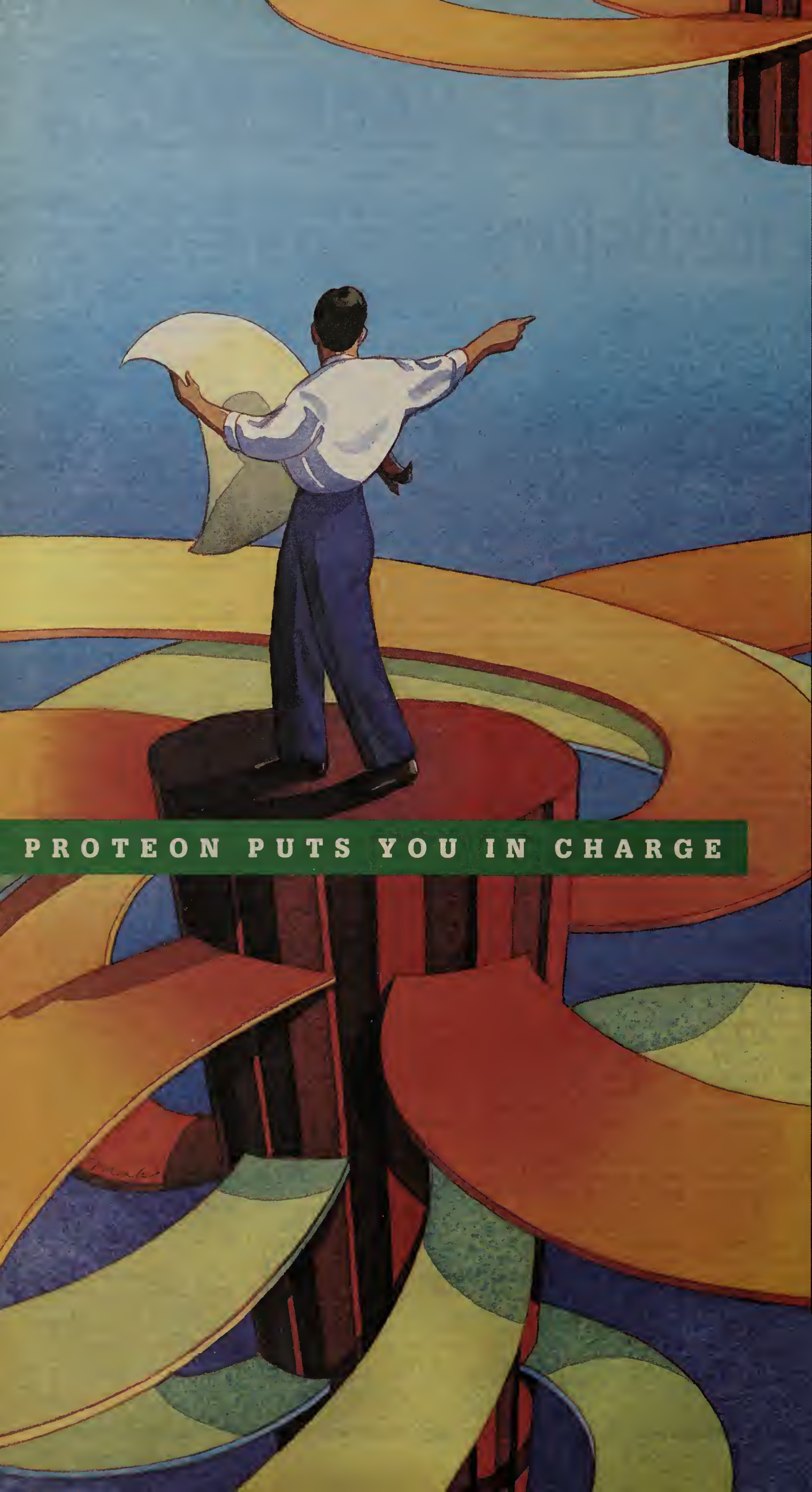
However, when several computers running different operating systems are networked, an API is needed to provide a common ground for their communications. This requires some type of standards.

Communications between two applications on different net-

software developers. While a standard defining Appli/Com for fax service is expected later this year, many Com/Protocol standards still need to be completed and overall market demand must develop. **■**

Krechmer is the principal of ACTION Consulting and technical editor of Communications Standards Review, which are both based in Palo Alto, Calif.

By KEN KRECHMER



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